



Investigating gender equality and gender-based discrimination in software development

Case study in a Finnish IT company

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Abstract

The underrepresentation of women in the IT field has been a constant global challenge for decades. IT companies are struggling to achieve a better gender diversity situation, since the number of women studying the STEM fields remains low. Recruiting is not the only challenge for the companies in the gender diversity issue, as also many women working in IT decide to leave for a work on another field. Gender-based discrimination has been suggested as one possible reason for the low retention of women.

This thesis study focuses on the discrimination by investigating the experiences and perceptions of software development employees with survey and interview methods. The aim in this qualitative study was to provide more information about the actual existence and nature of the gender-based discrimination. The topics related to discrimination were divided into two groups in the analysis, the ones which are related to formal discrimination and the other to informal discrimination. Formal referring to topics which affect pay and career advancement, and informal referring to the social environment at the workplace.

The findings suggested that both the formal and informal types of gender-based discrimination towards women do still exist in software development. They both seemed to affect the experience of gender equality and possibly also the retention of women. The active roles of scholars and practitioners are important in order to make a change; therefore, this study provides also suggestions for action based on the current literature.

Keywords

women in IT, gender diversity, gender equality, discrimination

Supervisor

Professor Netta Iivari

Foreword

For me this thesis was a great opportunity to give my best effort for the research topic which is important for the society and for the whole IT field, but also for me personally as a woman at the beginning of my career in IT.

Generally, I am a type of person who tends to consider various viewpoints before making any conclusions, and still, my personal opinions are often not black or white, but instead they have various shades of the spectrum. I think that this type of qualitative study represents also my personality, my tendency to listen what different people have to say, and my true interest of understanding the big picture.

I am grateful for the Case company of this study for giving me this opportunity and trusting that I would be a good person to conduct the study which topic was both challenging and sensitive. I was truly amazed the way the Case company really put their values in action, and I hope that other companies could do the same. Especially, I would like to thank my supervisors and contacts in the company for making this study possible in the first place, sharing their viewpoints, and also for the patience during the reporting phase. Same goes for all the participants of this study who gave their time to response for the survey and attended for the interviews, thank you for your time and trust.

Lastly, I would like to thank my thesis supervisor Professor Netta Iivari. The type of guiding I received exceeded my expectations and was very much needed during the writing process. I always left our meetings full of new inspiration and believe in my own abilities.

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1. Introduction

The underrepresentation of women in IT (information technology) is a global issue. Academics from all around the globe have investigated the topic for decades from many angles to understand the problem and to find solutions. Stout and Camp (2014) summarize that the unbalanced gender diversity situation in the IT workforce is a problem for at least two reasons. First, the more capitalistic viewpoint for gender diversity is emphasizing the fact that filling the constant need for more workforce and utilising various perspectives to innovate new solutions is going to be hard if we lack the potential of half of the population, women. Investigating the economical business outcomes has been a common focus of the studies regarding the IT context (He, Butler, & King, 2014; Milliken and Martins 1996), but also other organizational contexts too. The second reason is the humanitarian standpoint, which argues that all individuals should have the possibilities to be aware of the opportunities for them and to fulfil their professional interests in wide range of fields which are both financially and personally rewarding (Stout & Camp, 2014). In the organizational context this has not been as usual viewpoint, but some scholars argue that the gender equality is already a big enough research objective and we do not need material consequences to justify that (Vehviläinen & Brunila, 2007).

For the companies the most obvious motivation to work for greater gender diversity and gender equality is the legal one (Welle & Heilman, 2005), as the law for example in Finland forbids the gender-based discrimination in recruiting and at work (Act on Equality between Women and Men, 1986). Critics argue that since we have tried now for decades and still have not succeed in the efforts of trying to get more women on the field of IT, it is time to conclude that the situation is what it is. However, the scholars persistently supporting gender diversity argue that the criticizing stems from the frustration of not finding effective solutions during the last decades which calls for further investigations until women hold 50% of the seats in the power structure of IT. (Trauth, 2012.)

Gender itself is an interesting and important concept to be studied. Gender as a characteristic of persons is easily observable and therefore may often lead to stereotyping, consciously or unconsciously categorizing others and making conclusions of their unobservable attributes such as socioeconomic status, values and education. (He, Butler, & King, 2014.) This study has applied the social shaping of gender or so-called sociocultural theory (Eagly & Wood, 1999) to define gender. The theory rejects permanent bio-psychological gender differences, and therefore sex and gender are considered as separate terms. Still, this theory categorizes men and women as two separate groups by their gender, but the gender roles are socially and culturally shaped.

Also, wider definitions of gender, which consider the existence of other gender categories, have been acknowledged nowadays. For example, Finnish Ministry of Social Affairs and Health has defined that gender is an individual mix of physical, psychological and social dimensions (Ministry of Social Affairs and Health, 2015). There are two reasons why this study is limited to investigate the concept of gender based on the two gender groups, men and women. First, since the research topic is rather sensitive and all the participants were working locally on the same site, ensuring the anonymity of the participants was a priority. To avoid bringing up recognizable characteristics was one strategy to ensure anonymity. Second, this is in line with the previous practices as the prior literature, current official statistics in Finland, and the previous data of the Case company focuses mainly on the comparison of men and women in workforce. Concerning other gender categories

in the diversity policies and practices in organizations is an emerging field (Statistics Finland, 2016), but still in the official registers in Finland every citizen has either a man or a woman gender notation (Ministry of Social Affairs and Health, 2015).

The companies in the IT field need constantly more new professionals and are willing to hire well educated men and women. However, the number of women who apply for the jobs remain constantly low and the main reason is that only about 20% of the students in the IT field are women (Suomen virallinen tilasto, 2018b). Nevertheless, it seems that the lack of women entering the industry is not the only problem, as the research has also shown evidence of retention problems and issues in the career development of women (Ashcraft, McLain & Eger, 2016; Gammal & Simard, 2013). The gender diversity issue in IT field will continue to exist if the women who enter the industry end up leaving the IT field for good at some point of their career (Glass, Sassler, Levitte, & Michelmore, 2013). This calls for investigation of the barriers and challenges the women in the IT industry face. The literature presents evidence suggesting that gender-based discrimination might be one of the issues as it seems that in so called computer jobs women face significantly more discrimination compared to men. According to the study of Funk and Parker (2018) 74% of women had experienced gender-based discrimination, whereas the share of men was 16%. The types of gender-based discrimination women had experienced were various. (Funk & Parker, 2018.) Few previous studies (Dipboye & Halverson, 2004; Jones, Peddie, Gilrane, King, & Gray, 2016; Welle & Heilman, 2005) have investigated the effects of different types on discrimination in the field, and this study aims to provide further knowledge studying the existence of the formal and informal discrimination. Gender equality is closely connected to gender-based discrimination as the gender equality at work is much about forbidding the gender-based discrimination. This definition of gender equality of the Finnish legislation is used throughout this thesis. (Act on Equality between Women and Men, 1986.) In this study the existence and nature of formal and informal types of discrimination, as well as the perceptions of the gender equality, have been investigated in the Case company.

This thesis was an assignment of the Case company, a multinational large-scale IT company from Finland. The company considers the under-representation of women in the field of IT as a major problem which exist not only within the company, but also in the industry worldwide. Software development is one of the domains in the key role for the success of the Case company in the industry it works on. The empirical study of this research was conducted with the software development personnel of the company, but other studies in prior literature may have been conducted with somewhat different personnel in the field of IT. Therefore, this study uses the IT field as an umbrella term to sum up the variety of occupations in the field.

The following research questions were generated for the study:

What kind of gender-based discrimination is there nowadays in software development of large-scale IT companies?

- a. How men and women experience and perceive gender equality in their working environment?*
- b. How men and women experience and perceive topics related to formal discrimination?*
- c. How men and women experience and perceive topics related to informal discrimination?*

The data collection was limited to collecting answers from the employees of the local site with methods such as survey and interview. Conducting a qualitative study and using these methods were chosen to get more insights and understanding of the issues which had been partly already recognized in the Case company, but also generally in the IT field. The findings reveal that there still is some gender-based discrimination towards women in the software development, even though there were signs that improvements have happened during the last decades. The existing discrimination is both formal and informal which both seem to affect the experience of gender equality in the workplace.

This study consists of six main chapters. After this introduction the prior literature about gender theories, the most central topics from Finnish statistics and legislation, research findings related to gender equality and diversity in different organizational contexts, and finally, research findings regarding the women in IT field, will be presented in the chapter two. In the next chapter the Case company will be presented briefly and the formation of research questions in more detail. The chapter also consists of descriptions of the used methods and procedures which were implemented in the empirical study. Chapter four presents the results of the empirical study in analysed form. The results from the survey and interviews will be presented in their own sub chapters. After that, in chapter five, the author reveals the findings and answers to research questions in detail. Also, the meaning of the findings for both the academy and practitioners will be discussed with the background knowledge provided by prior literature. Finally, the conclusions will be summarized in the last chapter.

2. Prior research

Gender differences have been a long-lasting interest of both science and practice because it seems to affect so strongly the behaviour of human and nonhuman species (Ingallhalikar et al., 2014). However, diversity research is a very difficult field to review since it is a multi-disciplinary field, concerns the effects of various types of diversity, is in relationship to multiple dependent variables, and affects different types of organizational groups and settings (Milliken & Martins, 1996). For example studies of team diversity are grounded on multiple domains and fields of sciences, including social psychology, sociotechnical theory, industrial engineering, and organizational psychology (He et al., 2014). This literature review focuses mainly on the psychological differences of men and women which have been identified, taking also a look in the Finnish environment through statistics and local legislations, moving further to the gender diversity and equality in the organizational context, and even deeper in the field of IT.

2.1 The battle of sexes – How different we actually are?

Hyde (2014) states that it is important to study gender differences and similarities for several reasons. The first reason is that stereotypes about psychological gender differences are usual and they are influencing people's behaviour. Among gender, also other observable attributes such as ethnic background and age, have been found to cause responses which are based on biases, prejudices and stereotypes (Milliken & Martins, 1996). Hyde (2014) considers that it is important to evaluate whether the gender differences are accurate. Second, psychological gender differences are often used as arguments and explanations in various situations, such as in policy issues as maintaining separate education systems for boys and girls or explaining why there are less women studying mathematics. In order to evaluate such policy recommendations and explanations, it is important to have accurate scientific information. (Hyde, 2014.)

There are numerous theories and hypotheses in the science of where psychological gender differences stem from, but this chapter focuses probably on the most known or, as Hyde (2014) refers to them, the three "*grand theories*" of gender differences: evolutionary theories, cognitive social learning theory, and sociocultural theory. In contrast, also a rather new theory which focuses on the gender similarities instead of differences has been introduced.

2.1.1 Evolutionary theories

Based on evolutionary psychology psychological gender differences are the product of evolutionary selection, meaning that some behaviours are more adaptive for men compared with women and vice versa (Buss & Schmitt, 1993). The idea of evolutionary psychology has been grounded with two key concepts: sexual selection and parental investment. For example, gender differences in aggression has been explained with the theory of sexual selection (Darwin, 1859). Parental investment in turn explains that women have been involved in child care more tightly, which may have had effects on why women are not so strongly represented as men in science, technology, engineering, and mathematics, in so called STEM fields (Trivers, 1972). The evidence for and against the evolutionary theories seems to be mixed (Hyde, 2014). However, many evolutionary theorists have not considered natural selection in their analysis, which according to Hyde should create gender similarities. Hyde (2014) states that natural selection is a greater

force compared to sexual selection, because even at the chromosomal level only one of the 23 pairs of chromosomes, the sex chromosomes, differ between men and women. In the physiological point of view, human brain is in the centre of our behaviour. Ingahalikar et al. (2014) searched for gender differences in the human brain with neuroimaging and their findings can be considered highly significant addition to previously founded evidences of sex differences in the brain. The results suggested that at young age the development of the brains of girls and boys began to differ, which can be the reason of the differences in adolescence and adulthood. The neuroimaging results suggested that women are better able to facilitate communication between analytical and intuitive processing modes, whereas men in the study had better connection between perception and coordination (Ingahalikar et al., 2014).

2.1.2 Cognitive Social Learning theories

The cognitive social learning theory of Bussey and Bandura (1999) states that the behaviour of both children and adults is shaped by reinforcements and punishments. People also tend to imitate others who they find powerful or admirable. Bussey and Bandura (1999) presented plenty empirical evidence for their theory.

Later the theory has been further developed and cognitive components have been added, such as self-regulation, and self-efficacy (Else-Quest, Hyde, & Linn, 2010). Self-regulation is strongly related to the childhood development as their behaviour is first controlled externally with reinforcements and punishments, but as the children grow the control is internalized with standards and self-regulation. At the same time, children tend to internalize gender norms which is the cause of gender differences in behaviour. Self-efficacy is another cognitive component which seems to explain well psychological gender differences. Self-efficacy is a belief of a person in her or his own abilities to perform a task. For example, young girls have been found to be as good as boys in math, but still the girls' self-efficacy is lower. Self-efficacy has a power to affect decisions later in life. (Else-Quest et al., 2010.)

2.1.3 Sociocultural theory

Sociocultural theory (Eagly & Wood, 1999) was originally proposed as an alternative to the evolutionary theories of gender differences, even though the theory acknowledges biological gender differences. Eagly and Wood (1999) suggested that psychological gender differences are driven by the division of job positions by gender in society. Individuals adapt to the opportunities and restrictions in the society. When men achieved roles with greater power in the society, they became more dominant which was a useful character. Women at the same time took care of children and therefore developed abilities such as nurturance and communicational skills. Sociocultural theory is emphasizing cultural differences whereas evolutionary theories represent a view that gender differences are universal. (Eagly & Wood, 1999.)

2.1.4 Gender similarities

Traditionally research on genders has been focusing on the differences between men and women but recently scholars have started to emphasize the similarities between genders. In 2005, Hyde did meta-analyses on 46 available studies on psychological gender differences to investigate if there was evidence for the gender similarities hypothesis. The

hypothesis (Hyde, 2005) which stated that men and women are mostly similar what comes to psychological variables, found strong support in the study. 78% of the found gender differences in the reviewed papers were small or close to 0. Meta-analysis is a common method to assess results of multiple studies and it goes deeper than just finding simple yes or no answer by taking account the magnitude of the gender difference in psychological attributes in this case. Also moderators such as social context and culture were taken into account in the meta-analyses. (Hyde, 2014.)

In 2014, Hyde gathered numerous meta-analyses, and found more evidence for the gender similarities hypothesis. Different domains were investigated and most of the domains suggested similarity between genders, these included for example mathematical performance, leadership effectiveness, verbal skills and reward sensitivity. Also, few moderate or large differences between genders were found too in the study: for example, sensation seeking, interests in things versus people and physical aggression.

With these studies Hyde (2014) wants to suggest a new viewpoint for the research of gender diversity as it seems that documenting gender differences and their causes is relatively unimportant. Instead her proposal is to find training methods and interventions which could bring the best out of everyone. Hyde is however aware that despite of her efforts to propose new viewpoints, for years to come the focus of research will be strongly on gender differences as many scientists firmly believe in the existence of such differences and also because the findings of gender differences get visibility in media more than the similarities. Therefore, she also proposes better directions for gender difference research: intersectional and contextual approaches. Hyde suggests that instead of reporting just gender differences, researchers should broaden their view to investigate the intersections of gender and ethnicity, and gender and social class. Also, considering the contexts of where gender differences appear or do not appear should be even more present in research according to Hyde. Moreover, Hyde highlights that gender differences should not be overemphasized in research papers. Presenting the findings in such light can have serious costs. Gender similarities should be considered as interesting and important findings as well. (Hyde, 2014.)

2.2 Gender Equality in Finland – The legislation and statistics

Gender equality is a subject which may be viewed differently in different cultural, legislative, religious and economical environments. Therefore, the gender equality in Finnish environment has been described in this chapter from the viewpoint of legislation and official statistics. The definition of gender equality used in this thesis is based on the objectives of the Finnish gender equality law (Act on Equality between Women and Men, 1986, 1 §) described in the next chapter.

2.2.1 Gender equality in Finnish legislation

In Finnish government the work for equality between men and women started 1980 with the first equality program (Statistics Finland, 2016). Few years later in 1986 an equality law, Act on Equality between Women and Men was constructed. The law was put in practice in Finland in 1987 and has been updated later, last time in 2016. (Act on Equality between Women and Men, 1986.)

Equality affairs in Finland are the responsibility of the Ministry of Social Affairs and Health in which it is the Equality Unit which prepares and coordinated the policies

(Ministry of Social Affairs and Health, 2017). The Ombudsman for Equality is an independent authority which works with Finnish Ministry of Justice and controls the compliance of the legislation concerning gender equality. Jukka Maarianvaara has had the position since 2017 (Tasa-arvoaltuutettu, 2018). Equality Board is another independent authority unit which oversees the compliance of the legislation (Ministry of Social Affairs and Health, 2017).

The objective of the law is to improve the status of women especially in the working life by promoting equality between women and men and preventing gender-based discrimination (Act on Equality between Women and Men, 1986, 1 §). The actions employers are determined to do, as well as possible with the resources they have, to promote gender equality are listed in the act of law (Act on Equality between Women and Men, 1986, 6 §):

1. *act in such a way that job vacancies attract applications from both women and men;*
2. *promote the equitable recruitment of women and men in the various jobs and create for them equal opportunities for career advancement;*
3. *promote equality between women and men in the terms of employment, especially in pay;*
4. *develop working conditions to ensure they are suitable for both women and men;*
5. *facilitate the reconciliation of working life and family life for women and men by paying attention, especially to working arrangements; and*
6. *act to prevent the occurrence of discrimination based on gender*

Both direct and indirect discrimination are prohibited in workplaces by the law. Direct gender-based discrimination is treating someone differently based on gender, pregnancy, childbirth, gender identity or gender expression. Indirect gender-based discrimination is treating someone differently in a way which seems to be gender-neutral, but which leads the person to be in a less favourable position on the basis of gender. Also treating someone differently based on parenthood or family responsibilities is indirect gender-based discrimination. Discrimination in this law includes also harassment, whether it is sexual or based on person's gender, gender identity or gender expression. According to this law discrimination is prohibited whether it is based on facts or assumed information. (Act on Equality between Women and Men, 1986, 7 §.) Employer is responsible that discrimination will not happen in recruitment, in selection of persons in a particular task or training, in decisions of pay, continuation, duration or other terms of employment, in management of work, or in terminating employment relationships. (Act on Equality between Women and Men, 1986, 8 §.) The act prohibits punishing any person who has appealed to this law because of the discrimination he or she has experienced (Act on Equality between Women and Men, 1986, 8a §). Harassment should not be neglected by the employer if there are possibilities to eliminate it (Act on Equality between Women and Men, 1986, 8d §).

Employers are responsible to provide a written report about their procedures, without delay, for any person who considers that they have been a victim of gender-based discrimination in some situation related to employment or recruitment (Act on Equality between Women and Men, 1986, 10 §). If violations mentioned in this act will happen the employer is responsible to pay a compensation for the affected person, and in addition the affected person has the right to claim further compensation for the possible financial losses (Act on Equality between Women and Men, 1986, 11 §). If the employer refuses

to hand over information or documents the Ombudsman for Equality has the right to impose a conditional fine (Act on Equality between Women and Men, 1986, 21a §).

The act determines that employers are responsible to promote equality in a purposeful and systematic manner. In addition to the listed acts (Act on Equality between Women and Men, 1986, 6 §) this includes preparing at least every other year a gender equality plan together with the organization's shop steward, the elected representative, the occupational safety and health representative or other representatives appointed by the employees. The gender equality plan must have a description and an assessment of the current gender equality situation in the organization including descriptions of possible differences in pay and employment in different jobs. Also planned actions to promote gender equality should be in the gender equality plan as also the assessment of the success of previously implemented actions. (Act on Equality between Women and Men, 1986, 6a §.)

2.2.2 Gender equality and diversity at work in Finland

Statistics Finland is a national organization in Finland which serves as an information service providing official statistics. The data behind the statistics is mostly from general government registers but the Statistics Finland does also inquiries and interviews. (Statistics Finland, 2017.) The Equality Barometer is a report produced by Statistics Finland and published by the Ministry of Social Affairs and Health providing up to date information about opinions, attitudes and experiences about gender equality in public, and the changes in it over time. The latest Equality Barometer report is from the year 2017 when the sampling consisted 3000 people living in Finland from whom 1682 were interviewed. (Ministry of Social Affairs and Health, 2017.)

General gender equality and diversity

According to previous Equality Barometer research, majority of Finnish people have felt during the last 20 years that the status of men is generally better in Finland than the status of women when it comes to equality. The trend seems to be going slowly towards more equal views, but still two thirds of the respondents estimated that the situation of men is better than of women. More men than women think that genders are equal or rather equal. Only about 1/5 of the women and under half of the men thought that men and women are generally equal in Finland. Despite of the slow progress approximately half of the respondents have positive expectations for the future as they believed that the gender equality will enhance in the future. Most of the respondents think that gender equality is worth to strive for, as nine out of ten respondents think that also men will benefit from the equality. (Ministry of Social Affairs and Health, 2017.)

A clear majority would like to see more women in the decision-making positions in politics and in organizations. 9/10 estimated in the 2017 Equality Barometer that more women participating in politics is necessary in order to achieve comprehensive expertise in politics. 8/10 estimated that organizations and the economic would benefit if there were more women in boardrooms of companies. (Ministry of Social Affairs and Health, 2017.) According to the latest statistics in the middle size and big listed companies of Finland on average only 26% of the boardroom members were women (Statistics Finland, 2016). However, the openness of the public for gender balance is still limited as only about half of women and men in Equality Barometer thought that any gender is equally suitable for responsible duties in all fields of politics, such as defense policy and health care. A

common opinion still was that there should be more men working in the field of social and health care and more women should work in technical fields such as IT (Ministry of Social Affairs and Health, 2017), which indicates that the public would like to see the change towards more gender balanced fields happening from the roots towards the top.

IT is one of the most male dominant fields and the change towards more gender balanced situation is not going to be happening any time soon. The official Finnish statistics of Statistics Finland from 2017 shows that only 21,5% of the people who graduated from the field of IT from Finnish universities were women (Suomen virallinen tilasto, 2018b). 73% of the all labour in the field of IT were men (Suomen virallinen tilasto, 2018d). The statistics also show that the employment is equally good for both men and women in the field of IT. In 2016 from all 3178 people who had received a lower or higher university degree from the field of IT (science fields regarding information processing and telecommunications) 59% of men and 58% of women were employed a year after their graduation. 26% of all who had received a degree were still studying a year after graduation, and 9% were unemployed. (Suomen virallinen tilasto, 2018a.)

Gender equality and diversity in working life

The number of people who think that gender equality situation in their workplace is very good or rather good has continued to increase the past 20 years according to Equality Barometer, 70% women and 78% of men thought so in the 2017 survey. The situation of gender equality was generally better in workplaces where neither of the men or women was a clear minority. In men-dominant fields 66% of women and 81% of men thought that gender equality situation in their workplace was very good or rather good. (Ministry of Social Affairs and Health, 2017.)

Only 30% of women thought that women have as equal possibilities as men generally in working life, while the rate of men who thought so was 60%. Women also seemed to face negative attitude based on their gender more often than men at work according to Equality Barometer. Half of the women and about a quarter of men had faced depreciation from other people based on their gender. Over ¼ of women and 1/10 of men told that they had one or more persons at the workplace who depreciated them or had a negative attitude towards them because of their gender. Sexual or gender-based harassment at work was experienced by 14% of the respondents. About 1/3 estimated that a transsexual or intersexual person would face discrimination if they were working at the same company as the respondent. (Ministry of Social Affairs and Health, 2017.)

Even if preparing an equality plan at least every other year is mandatory for all companies with over 30 employees (Act on Equality between Women and Men, 1986, 6a §), the existence of such report is clearly not communicated that well in all companies. Only ¼ of employed respondents reported in the Equality Barometer (2017) that an equality plan had been made at their workplace. 40% of the employment respondents did not know if there was an equality plan or not. Supporting equally women and men in their career development is one of the possible actions that companies can make to promote gender equality. Women had received encouragement from other people, such as their supervisor, to move up to more challenging job duties a little more often than men. From all the respondents 44% had received encouragement from their supervisor. (Ministry of Social Affairs and Health, 2017.)

9/10 of respondents of Equality Barometer 2017 hoped that labor organizations would prevent more actively gender-based differences in pay. In the report every fourth of the

respondents reported that they have experienced at least minor disadvantage regarding pay because of their gender. In the field of IT, the inequality between men and women is visible in the salaries as in the private sector the monthly median salary for men was 4082 and for women 3685 euros in 2017 (Suomen virallinen tilasto, 2018c). However, the respondents in the Equality Barometer survey (2017) told that overall men had been a little more active in proposing pay rise for themselves.

Gender equality in balancing work with other aspects of life

1/5 of the respondents in the Equality Barometer 2017 thought that the man in the family is mainly responsible for the incomes of the family. However, at the same time 4/5 thought that men should participate more in child care and parenting. The traditional gender roles of men and women are still visible in balancing work and family life as the respondents estimated that taking family leave is still easier for women than for men, although the situation for men has gone to the increasingly equal direction. Especially men themselves feel that there is a barrier for them to participate more in family life as more men than women think that for men leaving for a longer family leave such as child care leave or parental leave is challenging. However, generally positive change has happened with the short leaves from work for example when a child gets sick suddenly. The results of the Equality Barometer (2017) showed that respondents think that staying home to take care of a child is easier than before, also for men. Still women reported that they are often the one taking care of the children in the family by being in contact with the school and nursery, taking care of a sick child and making sure that children will do their homework.

In relationships of two opposite genders household chores still tend to be shared based on traditional gender roles: Women do more domestic chores, while men do more repairing and maintenance chores. (Ministry of Social Affairs and Health, 2017.) The issue in these gender roles is that the domestic chores tend to be more time consuming. The statistics show that an average employed woman does household chores approximately 213 minutes per day while employed men use only 153 minutes (Statistics Finland, 2016). About half of the women in Equality Barometer (2017) thought that they are too much responsible of the domestic chores while only about 1/5 of the men thought the same. However more women than men felt that they have enough power in the decision making within the family.

2.3 Gender diversity in organizational context

Diversity as a word may cause various reactions for different persons. For some the reactions are emotional and intense as the word is reminding politically charged concepts such as “*affirmative action*” and “*quotas*”. Originally “*diversity*” was used to justify inclusion of people who were traditionally excluded from groups such as organizations. Grounding his vision in this original meaning of diversity, Herring (2009, p.209) stated that diversity should be an all-inclusive term that involves people from multiple groups. In organizational environment diversity refers to policies and practices to include people who are considered different from majority of members. Diversity in organizations usually means the aim to create an inclusive culture where all kinds of talents are involved and valued. (Herring, 2009.)

Milliken and Martins (1996) reviewed and evaluated research papers about the effects of different types of diversity in groups in various organizational levels. The research was

one of the first ones to attempt to form a mutual consensus about common patterns in organizations related to diversity. Despite the lack of common ground there was a lot of interest towards the topic since the organizations operated increasingly in multinational and multicultural contexts. Also, using teams to manage and coordinate work was becoming increasingly common in organizations. It meant that working people needed to be in contact with people outside of their particular functional group who might have different training, skills, background and values. (Milliken & Martins, 1996.)

Later Herring (2009) investigated the effects of workforce diversity on business outcomes. Organizational diversity studies may concern many types of diversities, but often gender is in the focus of the studies (Herring, 2009). Multiple studies about diversity in organizations claim that diversity in organizational groups is both a great opportunity and an enormous challenge (Herring, 2009; Milliken & Martins, 1996). For example Herring (2009, p. 211) describes diversity in organizations as a double-edged sword, as the studies have proven that diversity has both positive and negative influences in organizations.

According to Herring (2009) recent literature suggests positive effects caused by diversity such as broadening employee perspectives, strengthening teams, increasing resources for problem solving and creating creative conflicts. Positive effects lead to having the potential to consider a greater range of different perspectives and the possibility to generate more high-quality products and services. Because such clearly economically beneficial effects many companies want to cherish heterogeneous workforce. (Herring, 2009.)

The critics however question the extent to which workforce diversity can be beneficial and even suggest it affects negatively the business outcomes and generates more costs. Some scholars suggest heterogeneous teams are less cohesive which can lead to higher rates of absence and turnover (Tsui, Egan, & O'Reilly III, 1992). Rather usual claim is also that the quality of processes and end-products suffers because valuing diversity can lead to filling positions with unqualified workers (Rothman, Lipset & Nevitte, 2003). Milliken and Martins (1996) suggested that gender diversity could affect negatively the work of software project teams by hindering shared task understanding and awareness of expertise location, but later He, Butler and King (2014) investigated the topic and found no support for these hypotheses. Even if the current research shows more empirical support for the positive effects of diversity than for the negative ones, it seems that diversity in workforce can have indeed dual outcomes. (Herring, 2009.)

Herring (2009) used the value-in-diversity perspective from organizational theory to examine whether the benefits of workforce diversity is worth the claimed costs and negative effects. In his research Herring found that organization's gender diversity was associated with greater business performance based on sales revenue, number of customers and relative profitability.

2.3.1 Teamwork

Schippers, Den Hartog, Koopman and Wienk (2003) investigated the relationship of diversity and team outcomes and their results suggested that the relationship is not so straightforward as previous work had suggested. There are moderating and mediating factors such as reflexivity, outcome interdependence and group longevity which affect the outcomes of the team. The results of the field study of Schippers et al. (2003) suggested that for example outcome independence and group longevity moderate the

relationship of diversity and reflexivity in several ways. Highly diverse teams should be highly outcome-interdependence, or in other words have a clear shared goal, in order to be reflective. If a diverse team works together for a long time the reflexivity gets lower. Schippers et al. (2003) also managed to find evidence that the relationship of diversity to team satisfaction and commitment was not so clear as previous studies had suggested. Satisfaction and commitment seemed to be high only for those teams whose longevity was low.

Bell, Villado, Lukasik, Belau and Briggs (2011) highlighted that gender among age and race are easily observable, demographic characteristics. These easily observable characteristics are more likely to arise responses in us that result from basic social categorization. Although these characteristics are usually considered less job related, we still think that they influence team performance negatively because of social processes. The literature review of Bell et al. (2011) suggested mixed results about the relationship of diversity in demographic characteristics and team performance. According to the scientific literature between 1980-2009, gender diversity had a small negative relationship with team performance. However, diversity in functional background seemed to have positive impacts on the performance, creativity and innovativeness of the team. Also, educational background was related to higher team creativity and innovation, as well as better performance of top management teams. Based on these mixed results Bell et al. (2011) want to suggest more nuanced approach to diversity instead of just focusing on easily observable, demographic characteristics.

Software project teams put the capabilities of a team in a test. Typically, the projects are complex, dynamic, and involve unstructured tasks (Kraut & Streeter, 1995), and therefore knowledge and expertise from many domains are required. Team cognition which *“allows team members to draw on their own well-structured knowledge as a basis for selecting actions that are consistent and coordinated with those of their teammates”* (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000, p. 274) has been suggested as a critical mechanism for software teams, as it allows team members to utilize their own unique expertise in conjunction with the expertise of other team members (Kraut & Streeter, 1995). He et al. (2014) investigated how team diversity affects the development of team cognition structures. They found out that gender diversity had a strong positive effect on the formation of team cognition and the effect was lasting. However, Gila, Jaafa, Omar and Tunio (2014) investigated how men and women with diverse personalities work together in software development teams and found proof that the relationship of gender diversity and team performance is not simple. For example, groups lead by men were doing well with both genders in the team, but teams lead by women were at their best when the team had only women. These findings were however not so straightforward anymore when the authors investigated if the team members were introverts or extroverts.

2.3.2 Leadership, management

Gila et al. (2014) investigated also how personality types affect leadership outcomes in addition to gender. The results are interesting even though the sample in the research was small. The results of the study of Gila et al. (2014) show that it is best if the leader in a software development team is an extrovert whether the leader is a man or a woman. In contrast, especially women leaders who were introverts proved to be bad influence for team performance. Men leaders seemed to be suitable for both man-dominant teams and gender-balanced teams, whereas women leaders proved to be bad for the performance for this kind of teams, especially if the woman leader is an extrovert. Despite of the

complicated nature of team performance, Gila et al. (2014) state that gender diversity is a key element for team performance based on their study results.

To investigate the underrepresentation of women in the leader positions in organizations Reuben, Rey-Biel, Sapienza and Zingales (2012) studied potential explanations. They carried out an experiment in which groups choose a leader to compete against other groups' leaders in a task they had performed earlier. Only $\frac{1}{4}$ of the total sample were women. However, the share of women chosen into the position of a leader was even lower. A woman was chosen as a leader only in 4 groups of all the 33 groups. Reuben et al. (2012) found out that the overconfidence of men was the driving force why men were chosen more often than women. In contrast there were no gender differences found in the willingness to exaggerate past performance or reacting to monetary incentives. The authors suggest that to overcome the issue of overconfidence the individuals should be given reliable measures to assess their own past performance (Reuben et al., 2012). These findings are important because they show very clearly what effects the overconfidence of men can have in organizational environments.

Leading a group involves a responsibility to make risky decisions which can affect all members of the group. Ertac and Gurdal (2012) studied if there are differences between men and woman in their willingness to make decisions on behalf of a group, and if there is a difference between men and women in how big risks they take. The results of the study showed a clear difference in the willingness, as the number of women who were willing to make risky decisions behalf of the group was much lower than the amount of men. However, the results also suggested that the men who were willing to lead were taking bigger risks than those who were not willing. Among women the extent of the risk was not in a relationship with their willingness to lead the group. (Ertac & Gurdal, 2012.)

2.3.3 Boardrooms

In companies the board of directors plays an important role monitoring the performance and governing the corporation. There is a large body of literature examining the relationship between gender diversity in boardrooms and the outcomes. Mostly the arguments for greater gender balance can be divided in two categories: ethical and economic. (Campbell & Mínguez-Vera, 2008.) The number of women in corporation boardrooms in Finland has increased rapidly in last ten years as in 2008 the share of women was 12%, but in the latest review of 2018 there were 29% women (Keskuskauppakamari, 2018). Finland is ahead of the rest of the Europe in the gender diversity of corporate boardrooms, as the average share of women in the boardrooms of largest companies in Europe reached 23% and in Finland 29%. Few countries in Europe have gender quotas for public corporations, but in Finland there have not been such (European Commission, 2016).

The company's financial performance is one subject which has raised a lot of interest in the gender diversity literature, and the results of studies are mixed (Campbell & Mínguez-Vera, 2008; Post & Byron, 2015). As the evidence has been both positive and negative the current literature provides also few larger analyses of the available data. In 2008, Campbell and Mínguez-Vera investigated the relationship of gender diversity in boards and the financial performance of firms by analysing the available data of listed companies in Madrid. According to the results the presence of women on the boards in itself did not affect the firm value. However, the gender diversity of the board, measured from the share of women, was found to have a positive impact on firm value. Therefore, the authors suggest that the companies in Spain should put effort not only having women on the board

of directors, but also reaching for the gender balance of boards. (Campbell & Mínguez-Vera, 2008.) However, another study from 2015, did not find any evidence of the correlation of women on corporate boardrooms and the financial performance (Pletzer, Nikolova, Kedzior, & Voelpel, 2015). One of the limitation of the studies of Campbell et al. (2008) and Pletzer et al. (2015) however was that they did not consider any other other factors in the context.

In 2015, Post and Byron did a meta-analysis to figure out when and how greater gender diversity might improve the financial performance of the company. Based on 140 studies the authors found out that the impacts of the amount of women in boardrooms are not straightforward and simple, socio-cultural and regulatory contexts seemed to have an impact too. Even if the accounting returns seemed to be higher in firms with more women in boards, there was no direct relationship with women on boardrooms and market performance. However women directors contributed positively to the board decision making. The authors suggested that companies should aim to have a culture where dissenting opinions are heard and considered. For industries where there are only few potential women directors their suggestion was to make efforts for better boardroom gender balance, in order to get also women's experience, knowledge and values into the decision-making. (Post & Byron, 2015.) Miller and Ubeda (2012) have found also evidence about the differences of women and men in decision making context. The results of their study suggested that women are more context sensitive compared to men, which reinforced what the previous literature also suggested. Another study found evidence that women are less willing to take financial risks than men (Charness & Gneezy, 2012).

In addition to financial performance, another topic which has raised interest in the research and practice is social performance. It has been increasingly perceived as a competitive advantage for companies because it is linked for example to organizational commitment, employee satisfaction and stakeholder satisfaction. (Byron & Post, 2016.) Actually, according to meta-analytic evidence corporate social performance contributes to the financial performance of the firm (Wood, 2010). In 2016, Byron and Post found evidence that women's representation in boardrooms has a positive relationship with social performance of the company (Byron & Post, 2016).

2.3.4 Gender-based discrimination at work

Dipboye and Halverson (2004, p.131) defined that workplace discrimination occurs when individuals of a group *"are put at a disadvantage in the workplace relative to other groups with comparable potential or proven success"*. According to a recent study (Funk & Parker, 2018), women in IT jobs experience far more gender-related discrimination than men in IT. In so called computer jobs, which consists of software developers, computer scientists, system analysts and information system managers and programmers, 74% of women have experienced gender-based discrimination at work, whereas the share of men was 16%. According to the study in the STEM-field of the United States the gender-based discrimination of women is a problem especially in the companies where the clear majority of employees are men. In those companies 78% of women reported that they have experienced gender-based discrimination, whereas the share of women was 44% in companies where there were more women or a rather even gender mix. In contrast, 41% of women in non-STEM jobs reported that they have experienced gender-based discrimination, according to the same study (Funk & Parker, 2018). There were questions about eight types of gender-based discrimination in the study, and the ones that occurred most often in the responses of women in the STEM fields were earning less than a man doing the same job (29%), having someone treat them as if they were not competent

(29%), experiencing repeated, small slights in the workplace (20%), and receiving less support from senior leaders than a man who is doing the same job (18%).

Sexual harassment and blatant discrimination are usually the types of discrimination we first think about a working environment which is hostile for women. Welle and Heilman (2005) note that the current literature however suggest that gender discrimination is expressed also in less visible ways. In addition to more visible types of gender discrimination, for example social exclusion, lack of mentoring, and ending up outside of informal networks can also be barriers to the career advancement of women. Men are less likely, compared to women, to believe that any of that kind of less visible discrimination might affect the career development of women. (Welle & Heilman, 2005.) In addition, Crosby (1984) has demonstrated that women do not acknowledge the ways that gender discrimination may affect their career development and experiences. Instead women, compared to men, tend to take more likely personal responsibility for the career challenges they face because of discrimination. Despite that, these same women may still believe that gender discrimination is a problem at their workplace for other women, but not for themselves. (Crosby, 1984.)

To demonstrate the consequences of such gender discrimination which might at first feel minor Martell, Lane and Emrich (1996) developed a computer simulation. The simulation showed that if in a company only 5% of decisions for promotion are biased against women, the consequences are still far more visible in the upper levels of the organization. It means that if there are 50% of women in the lowest level, in contrast at seven organizational levels higher there are only 29% of women left because of the discrimination of 5% in the promotion decisions. As demonstrated, gender discrimination can affect the career advancement of qualified people, but also it can have an effect on the experiences of employees at the workplace. Women are less committed to their work, if they have experienced discrimination at work, or have seen colleagues been affected by it (Ensher, Grant-Vallone & Donaldson, 2001). According to another study gender-discrimination had even more negative relationship with attitudes towards the job and intentions to leave, than did sexual harassment (Shaffer, Joplin, Bell, Lau & Oguz, 2000). To reduce gender-based discrimination it is crucial for companies to understand the underlying dynamics of discrimination. It is more effective to target the root causes of negative behaviour with interventions which are designed for that purpose, than try to change something that is on the surface-level of the phenomenon. (Welle & Heilman, 2005.)

To understand the dynamics of gender-based discrimination, the phenomenon can be divided in subcategories. In scientific literature at least two different categorizations of discrimination have been used: overt and subtle discrimination (Jones, Peddie, Gilrane, King, & Gray, 2016), and formal and informal discrimination (Welle & Heilman, 2005). For example, Dipboye and Halverson (2004) have used the categorization of discrimination in overt and subtle types, as well as Jones et al. (2016) when they investigated the impact of such types of gender and racial discrimination at workplaces. Overt discrimination describes such workplace behaviour that reflects blatant antipathy, use of pejorative stereotypes, and beliefs that the members of stereotyped groups are inherently less talented. In contrast, subtle discrimination is actions which cannot be defined easily if they are meant to be harmful, they are often unintentional, difficult to detect and are low in intensity, but still the effect of such discrimination can be deleterious to those who are the target in the workplace. (Dipboye & Halverson, 2004; Jones, Peddie, Gilrane, King, & Gray, 2016.)

As the effects and costs of workplace discrimination have been acknowledged, such as increased turnover intentions and worsened attitudes of employees, many companies nowadays try to make efforts to reduce the experiences of discrimination for their employees. However, the efforts have not been very effective, which might be because the workplace diversity efforts are often targeted towards the overt discrimination, whereas the subtle one is usually less or more overlooked. (Shih, Young & Bucher, 2013.) It is easier for companies to attack the overt, easily recognizable forms of discrimination for example with internal policies. Interpersonal, subtle discrimination is hard to detect and define for all contexts, and therefore it cannot be easily quelled with the policies (Jones et al., 2016). Jones et al. (2016) contended in their paper, based on their meta-analytic study, that the consequences of subtle discrimination are at least substantial, or even more substantial, compared to the effects of overt discrimination. The authors highlighted three reasons why subtle discrimination may be so deleterious. First, subtle discrimination is harmful because it is so hard to detect and assess, even for the ones who experience it. The ones who experience overt discrimination can easily externalize the negative experience to discrimination, because it can be easily identified, and it is largely disapproved. Instead, with subtle discrimination, the person who has been the target may make internal attributions and think that the fault is in him or herself. Second, the authors note that companies usually have formal policies for reporting overt discrimination, but for subtle discrimination there are not as many clear options for reporting and dealing with such behaviour. That is why the subtle discrimination may be experienced even more negatively than the overt one, by the target persons. Finally, because overt discrimination is disapproved it usually does not occur often. Instead subtle discrimination may be higher in frequency, why it may cause chronic, harmful effects for the person who experiences it. (Jones et al., 2016.)

Welle and Heilman (2005) have used the other categorization of discrimination, to formal and informal types, in their study. The formal type refers to the biased usage of organizational resources such as pay, promotions and job responsibilities. The informal type instead is about the interpersonal relationships between employees and the quality of them. (Levine & Leonard, 1984.) Welle and Heilman (2005) argue that those types of discrimination are both impacts of stereotyping processes. The authors did a review of the scientific literature in 2005, concerning especially gender stereotypes in workplace. They described that the stereotyping of women in workplaces happens in forms of descriptive and prescriptive stereotyping. Welle and Heilman (2005) say that the descriptive stereotyping is fuel for formal discrimination, for example recruiter can have a stereotype-consistent view of women applicants, and therefore the perception of women could be that they are less likely to have the skills to succeed in male gender-type jobs. Because of descriptive stereotyping, we think we know what kind of internal characteristics people have just based on their gender (Stangor, 1988). Descriptive stereotyping may indirectly contribute also to informal discrimination. Negative expectations of the skills and abilities of women may lead others to exclude them from informal networks, and therefore women may have less chances of becoming a central player in the company. (Welle & Heilman, 2005.) Prescriptive stereotyping refers to the characteristics that describe how men and women should be. In other words, we have beliefs of what is appropriate and inappropriate for individuals, based on their gender. (Terborg, 1977.) The various negative effects of prescriptive stereotyping have been presented in the prior research. Women who show characteristics which are usually considered masculine, are less liked at work and they are less likely to be considered for promotions, even if they are equally competent compared to other in their working environment (Heilman, Wallen, Fuchs & Tamkin, 2004). Also women leaders and their

performance are assessed more negatively when the women is using leadership style which is traditionally considered masculine (Eagly, Makhijani & Klonsky, 1992).

Welle and Heilman (2005) report that according to their review of literature, there is a lot of evidence that both descriptive and prescriptive stereotypes can affect objective decision-making within companies which is visible in form of formal and informal discrimination. However, they note that because stereotyping is a process that happens often without conscious awareness, it is not likely to notice the ways in which our attitudes are guiding our behaviours. Despite the challenging nature of discrimination, Welle and Heilman (2005) believe that companies can moderate the extent of discrimination at work with policies and practices. Several simultaneous efforts must be taken, and the efforts may have some disadvantages at first but in the end the efforts will pay off. First, individuals in the company must be educated about discrimination. Second, it is necessary to define what type of skills different jobs require in order to objectively assess if someone has the required competence. And finally, companies should seek and use the knowledge provided by gender-discrimination research to generate suitable programs for reducing discrimination. (Welle & Heilman, 2005.)

Doing only the first suggestion of Welle and Heilman (2005), only educating the individuals about stereotypes and discrimination, is not enough. That has been the main strategy to battle against gender-based discrimination since the 1970s, and the results have not been staggering (Paluck & Green, 2009). It has been argued that we should use more relevant metrics and generate interventions based on facts of what works (Bohnet, 2016; Holtzblatt & Marsden, 2018a). Some approaches against gender-based discrimination for specifically the IT field will be described later in this thesis, in chapter 2.4.4.

2.4 Women in IT workforce

Despite the raising interest towards the field of gender balance in organizational contexts, the number of published research papers related to the topic in the fields of Software Engineering and Computer Science seem to be surprisingly low. Spichkova, Schmidt and Trubiani (2017) did a systematic literature review to investigate the number of research papers. The results with the search string “(“women” OR “gender”) AND “software engineering”” were in numbers: 31 in Scopus, 36 in IEEEExplore, 19 in ACM and 9 in Springer Link partially overlapping. Most of the results were focused on teaching of the courses of IT subjects. The literature for this chapter was collected mostly by using snowball method. The scope for the literature review of this chapter was not as wide as in the study of Spichkova, Schmidt and Trubiani (2017), and therefore the number of direct search results related to women, career paths and IT field were rather low. Search results such as the ones focusing on the education of IT, or the ones regarding academical career paths were excluded from this literature review as this study focuses on the gender diversity issues within IT organizations and in the career paths of women in IT. Despite the low number of search results, a good body of literature was found with the snowball method. It may suggest that the terms in use vary in the research papers around the topic.

The underrepresentation of women in STEM field is well known, and a variety of explanations have been offered for the situation (Hyde, 2014). Many of those explanations are grounded by the theories presented in the chapter 2.1, the three “*grand theories*” of gender differences: evolutionary theories, cognitive social learning theory, and sociocultural theory. In 2005, the president of Harvard University, of that time, spoke in a science conference that it may be that women lack the mathematical ability to succeed in the STEM field (Summers, 2005). Some scholars argue that the environment is chilly

towards women in IT work and education (Stewart & LaVaquer-Manty, 2008). It has been also argued that girls and women themselves lack the interest towards the field (Ceci & Williams, 2011), and that might be a consequence of the stereotyped beliefs and behaviour of parents and teachers (Chhin, Bleeker & Jacobs, 2008). Other emphasize the often very important role of women in the families, and that there are perceptions that the highly pressured work in IT field would not be suitable for women with families (Frome, Alfeld, Eccles, & Barber, 2008). One suggestion has also been that in post-industrial nations people tend to seek occupations which are highly interesting and which they would love, which means in many cases that women choose other occupations (Charles & Bradley, 2009). In the study, the gender gap in occupations was found to be largest in post-industrial nations, such as Finland, compared to materialist nations with developing economies. Unfortunately, also discrimination is still one of the possible explanations for the under-representation of women in IT as empirical evidence confirms that the bias against women job candidates still exists (Moss-Racusin, Dovidio, Brescoll, Graham & Handelsman, 2012).

Vehviläinen and Brunila (2007) argue that gender equality workers need to often justify the need for equality research, for example to get funding, to stakeholders who often have little knowledge of the social constructions which belong to gender equality in IT. The justifications therefore are too often about material consequences such as efficiency, competitiveness or good practices. Those terms favour management, but do not lead towards situated equality. Instead developing gender equality should be an objective as itself. (Vehviläinen & Brunila, 2007.)

Is it worth to keep on the debate to get more women in IT workforce or should we just accept that the field of IT will be man-dominant in the future too? According to Trauth (2012, p. 54) the answer is “Yes”, we should strive for the more balanced situation of genders in the IT workforce. Many other argue that at least the discussion should be broadened to include other types of diversity such as ethnicity, disability and sexuality, instead of having the emphasis on gender, or even worse on women especially. Trauth (2012) wonders is it so that many other think the underrepresentation of women is no longer an issue because we have already done some efforts to change that and now it is just time to move on to other topics. Trauth (2012) however thinks that if we settle for the current situation of gender diversity in IT, there is the danger that we conclude that this level of diversity and equality between genders are normal. She argues that women are underrepresented, until they hold 50% of the seats of the power structure in the IT field. Therefore, the gatherings of networks promoting gender diversity and developing interventions are still necessary, in academy and in practice. (Trauth, 2012.)

2.4.1 Epistemologies and theories in gender and IT research

The choice and use of theory are critical phases in a research in which a goal is to understand the complex factors leading to the underrepresentation of women in IT. Theories guide the conceptualization of the research problems, the choice of methods for empirical studies and the basis for analysis, and finally how to draw the conclusions. (Trauth, 2006.) However it has been criticised that the research of the topic of gender and IT has been undertheorized (Adam, Howcroft, & Richardson, 2004). Trauth has investigated the usage of theories in gender and IT studies throughout the years. She summarises (2006) that there are three types of undertheorized research of this topic. Pre-theoretical research has been practiced in studies where there is no theory guiding the formation of research questions, data collection or analysis. Implicit-theoretical research is visible in papers which do not disclose application of any theory in the study, but still

the analysis can be clearly done from the perspective of inherent differences between men and women. And finally, in insufficient-theoretical research, while there has been a theory in use, there are gaps in the theoretical landscape. (Trauth, 2006.)

Trauth states (2013) that if there is a theory in use at the first place, the most often employed theories in the papers of this topic have been gender essentialism, social shaping of gender and gender intersectionality. Gender essentialism generally assumes the existence of fundamental differences between men and women. The underlying principle is the gender binary assumption, and that sex and gender go hand in hand: men are masculine and women feminine. When this theory is employed in gender and IT studies, the found gender differences are considered as inherent and permanent biological and psychological characteristics between all men and women. Social shaping of gender is a theory which is not far from the principles of gender essentialism. (Trauth, 2013.) Even if this theory is different in the way that it rejects permanent bio-psychological gender differences, the theory still categorizes men and women as two separate groups. The social shaping of gender theory derives from the social shaping of gender and sex roles (Eagly & Wood, 1999). Finally, the gender intersectionality theory is different from the two other theories because it emphasizes the variability and nuances within gender groups. This derives from the consideration of other identity characteristics such as race, ethnicity, gender identity or sexual orientation in the gender research. Also, the authors which have employed this particular theory, have not considered “*gender research*” as “*gender differences research*” (Trauth, 2013, p.288).

Trauth and Howcroft (2006) have also brought up the discussion about epistemologies, the philosophy or so called lens of how to use the theories in the research of gender and IT. The consideration of the employed epistemology is equally important as the choice of theories, since the topic of gender and IT changes with the epistemological lens. Trauth and Howcroft (2006) demonstrated the differences of positivist, interpretive and critical epistemologies. The nature of positivist epistemology is neutral and dispassionate when applied to the topic of gender and IT. The aim is typically to investigate whether and where there are differences between genders, and not to explain why these differences occur and continue to exist. Often essentialist theories are employed in positivist studies. Interpretive epistemology is a philosophy which, employed in gender and IT studies, aims to offer understanding for why gender differences occur by considering the context. Often the theories of the social shaping of gender and individual differences are used in interpretive studies. Finally, the critical epistemology has objectives to challenge and undo the existing gender inequality, unlike in the other two epistemologies presented here. The critical research shifts the focus away from the themes of efficiency, profitability and effectiveness, towards the power relations and themes beneath that, control, resistance and inequality. (Trauth & Howcroft, 2006.)

In 2006, the suggestions of Trauth and Howcroft were to decrease the use of essentialist theories which dichotomize men and women, and instead highlight more the power relations which can help to understand what is beneath of the surface of the career experiences of women in IT. That is basically limit the use of positivist lens and increase the employment of more critical view. In 2013, Trauth continued to follow the same line in her new suggestions for gender and IT research. She again highlighted that purely descriptive studies may lead to worsening group stereotypes regarding men and women, and that is why the research should go further by including more nuanced analyses of the phenomena. To get theoretical variation for the analyses, we can import gender theories from other fields, for example from women’s and gender studies. To address this need for theoretical variation Trauth (2002) developed a theory, Individual Differences Theory of Gender and IT. The theory aims to help to understand the individual and environmental

forces related to the underrepresentation of women in IT. However, she says (2013) that the descriptive studies are also valuable, as far as we have the balance between the positivist, interpretive and critical epistemologies. Trauth (2013) also states that it is time that the research of the gender and IT should be fully inclusive, by including also gender minorities and the intersectionality with other characteristics such as ethnicity in the studies. Lastly, Trauth (2013) wants to emphasize that the gender and IT research should not be gender differences research, and actually sometimes an important finding can be that there were no significant gender differences found in the study. At large, the opinions of Trauth (2013) about gender and IT research follow the same line with Hyde's opinions (2014) about the general gender research (chapter 2.1.4): Gender differences should not be over emphasized, considering intersectionality and the context in research is important, and the research should not settle for describing the current state but aim for developing methods and interventions to make a change for the better.

2.4.2 The root problems for the under-representation of women in IT

It is no secret that the underrepresentation of women in IT is a global issue. In fact, all of the prior research presented in this chapter of Women in IT (2.4) is based on the problem of having only few women in IT. These studies represent theoretical and empirical research efforts from Europe, North America and Asia. In Finland, the current state of gender diversity in the field of IT is rather unbalanced, 73% of the all labour in the field of IT are men (Suomen virallinen tilasto, 2018d).

Why is the underrepresentation of women in IT considered a problem? Stout and Camp (2014) summarize that there are at least two types of arguments for greater gender diversity. The first one is the humanitarian standpoint, that all individuals should have the possibilities to be aware of the opportunities for them, the opportunities to express their interests in wide range of professions which are also financially and personally rewarding. The second, more capitalistic viewpoint for gender diversity, emphasizes the fact that it is unsustainable and bad for the innovativeness if we rely primarily on only half of the population, to manage most of the IT field. We will need more workforce for the field, and more diversity in the experiences and perspectives of the workforce. (Stout & Camp, 2014.) The underrepresentation of women in IT is clearly a problem for both the society and the IT companies for many reasons. But why the companies in the IT field are having this problem, can be divided in two root problems recruiting and retention, which both have gained attention in the academy.

Recruiting

Recruiting issues of women are clearly the main reasons behind the under-representation of women in the IT workforce. As the official Finnish statistics show it, the rate of women studying IT remains low, only 21,5% of the graduates of the IT field in Finnish universities are women (Suomen virallinen tilasto, 2018b). However, according to the statistics in 2016, 59% of men and 58% of women were employed a year after their graduation (Suomen virallinen tilasto, 2018a). This suggests that in Finland there is no significant discrimination of women in the recruitment process. The recruiters in IT however face a gender balance problem with the reality that there just is not as many women applying for jobs as men.

Since this thesis is focused on investigating the factors affecting the career paths of the women who are already employed in the field of IT, the issues of recruitment are mostly

out of the scope of this thesis. However, there are two themes which are brought up in the literature more than others: the belief that women and else who present the minority groups of IT field perceive the career in the IT field negatively, and that there is a common perception that women lack technical skills and also women themselves seem to have a negative self-perception of their technical skills. (Tapia & Kvasny, 2004.) So, it seems that there are big issues in the society of how the work in the technology field is seen, how we think about women and their skills, and especially how we can support women to think that the IT field is full of opportunities for them to take over.

Many high-tech IT companies have committed resources to battle the gender diversity problem and have created a pipeline from which they can recruit the underrepresented employees of minority groups. The actions for creating a pipeline for more women include for example setting goals for the share of women in the workforce, creating programs for apprenticeships and internships, participating in events and actions of Girls Who Code and other organizations which promote IT field for girls, and creating C-level positions for Diversity and Inclusion. Despite the efforts of companies, the recruiting of individuals who present the minority groups continues to be a challenge. (Holtzblatt & Marsden, 2018a.) The focus of the efforts has been largely in the recruitment and to increase the number of women in the company, but retention and career advancement of women have unfortunately been overlooked (McGee, 2018). Efforts for creating the pipeline are surely critical for the greater diversity, but the high numbers of women who decide to leave the field suggest that creating a pipeline is not enough (Holtzblatt & Marsden, 2018a).

Retention

Recently the retention of women in IT has got more attention in the research, and the statistics suggest strongly that there are issues which need to be solved. Results from multiple studies show that the rate of women who leave over time their career in IT field is over double the rate of men who leave the IT field. (Ashcraft, McLain & Eger, 2016; Gammal & Simard, 2013.) The latest review of Ashcraft, McLain and Eger (2016) indicates that 41% women leave whereas the rate of men is 17%. Compared to other field women leave STEM at much higher rates: Within the first 12 years 50% of the women who had entered the field have left and are employed in other fields, whereas only 20% of women in other professional fields than STEM leave their field of work during the first 30 years (Glass, Sassler, Levitte, & Michelmore, 2013).

For companies the low retention of women is a significant cost. The investment for the training and support of an employee is lost when a person leaves the company, and recruitment and replacement with a new employee is not free either. Replacement costs can be even twice the salary of the employee (Gammal & Simard, 2013). Companies also suffer in the attempt for greater gender diversity which could possibly support the innovativeness and financial performance (Hunt, Prince, Dixon-Fyle, & Yee, 2018; Stout & Camp, 2014). In addition, they also lose the potential women leaders, which is even more important nowadays because companies are being judged by the percent of women leaders. McKinsey & Company report even suggest that, instead of focusing on creating the pipeline, if companies would focus on finding solutions for the retention problems with the same intensity, the IT companies would benefit the most. (Hunt, Prince, Dixon-Fyle, & Yee, 2018.)

The reasons behind the high quit rate of women are various, according the report of The Anita Borg Institute (Gammal & Simard, 2013) the reported reasons of the leavers are

most often the following: Working conditions - no advancement, too many hours or low salary (30%), Work-life integration - wanted more time with family, conflict with family or too much travel (27%), Didn't like the work - lost interest or didn't like daily tasks (22%), Organizational climate - didn't like culture, boss or coworkers (17%). However, all studies are not at the same line with the results of the report of the Anita Borg Institute. Some studies for example suggest that the work-family integration reasons are not the ones behind the low retention of women. In fact, an empirical study shows evidence that men are actually more affected by the work-family balance issues (Sumner, 2008). Because the prior literature presents a lot of empirical evidence about the challenges faced by women working in the IT field, Holtzblatt and Mardsen (2018a) argue that the core issues of women in IT are related to the experience of the daily work life and the culture of the workplace. More insights about the suggested reasons behind the low retention on women in IT will be provided in the next chapter 2.4.3.

The recruitment issue has been paid more attention to earlier (Trauth, Quesenberry, & Morgan, 2004), but recently the importance of developing retention strategies has been also notified. Retention is not only about the objective of keeping the employees in the organizations, but also about their possibilities to level up in their career (Tapia & Kvasny, 2004). Annabi and Lebovitz (2018) note that the retention on women in IT is a complex issue because the root causes of leaving the career in IT are difficult to describe and isolate. They however state that organizational and societal structures which form the barriers for women to stay in are at the core of the issue. Organizational interventions are aimed to address the barriers women face and to create an inclusive workplace for all. (Annabi & Lebovitz, 2018.) What the current literature suggests for the actions for better retention and advancement of women, as well as for better overall equality, will be presented in the chapter 2.4.4.

2.4.3 Factors affecting retention and advancement of women

The Anita Borg report (Gammal & Simard, 2013) summarizes the reasons for low retention of women from the viewpoint of those women who had left the industry. Understanding the reasons behind the decision to leave is crucial for the development of good interventions. The most commonly reported reason for leaving, working conditions, which included dissatisfaction to the advancement possibilities, amount of work and salary is visible also elsewhere in the literature. For example, Holtzblatt and Mardsen (2018a, p. 2) refer to the "*hero culture*" of IT, where those employees who are willing to work long hours to save projects are rewarded, not the employees who are working every day to prevent the problems. This kind of culture is not often suitable for women with family responsibilities. They feel that they cannot give that big of an effort for job and that is why women refuse from certain jobs in IT (Gammal & Simard, 2013). The second most often reported reason for leaving was work-life integration, which included wanting more time with family, conflicts between family and work and too much travelling. Sumner (2008) however investigated and analyzed the work-family issues of IT professionals and found out that a family friendly culture in the workplace did have a positive impact reducing the work-family integration issues. Also, a surprising gender difference was found in the study. Against the common belief, men reported more often than women that they had experienced work-family integration issues. The third most often reported reason for leaving in the report of Anita Borg institute was not liking the work which included losing interest over time and not liking the daily tasks. LeRouge, Wiley and Maertz (2013) investigated empirically the belief that women leave their career in IT because the jobs are somehow less satisfying for women. Their findings suggested that in general, compared to the experiences of women in other occupations, women are

not less satisfied with their work in IT. However there was differences in the satisfaction with the work itself and the job security. Investigating the satisfaction with advancement opportunities, compensation, one's supervisor and work-life balance suggested no significant difference between women in IT and other women. Finally, the fourth most commonly reported reason for leaving was organizational climate consisting of not liking the culture of the workplace, boss or coworkers. Organizational climate as a reason of leaving has also been seen as a critical factor for staying in the company. (Wiley & Maertz, 2013.)

Some of the scholars who have investigated the experiences of women about the organizational climate are Holtzblatt and Marsden (2018a). In contrast for the Anita Borg institute report (Gammal & Simard, 2013), they interviewed the women who were still working in the IT field in order to identify the critical factors of the daily work experience for the retention of women. The study (Holtzblatt & Marsden, 2018a) suggested that the following six factors are critical for the women. 1) Dynamic, valuing team: Women appreciate dynamic work-focused teams and partnerships. 2) Stimulating project: Women love working on technical problems, products and research questions which are challenging and important for the company, and they switch their job if they get bored. 3) Push and support: Women appreciate support from managers and the work community, but they may need also push from trusted managers, colleagues and family members because they do not always feel qualified for the next challenge. 4) Local role models: Women need coaching relationships within the company to get support for the challenges at work and in career advancement. If the lives of the ones on upper level seem desirable, women may seek for promotion. However, they often do not. 5) Flexibility with no judgement: Women with children often feel judged when they need flexibility from work. Women feel that valuing employees can be shown with flexibility and the team should be flexible for everyone's life commitments. 6) Personal power: Women may doubt their own skills, readiness and value. Positive feedback, helpful critique, clear expectations, and good coaching can increase the self-esteem of women. (Holtzblatt & Marsden, 2018a.) These critical factors have been also validated (Holtzblatt & Marsden, 2018a) with a survey tool and the current results have provided support for the value of these critical factors for the retention of women in IT. The authors speculated if these factors are actually critical for everyone in IT workforce and not just for women. Comparison of the results from different gender groups was not in a focus of this survey.

McGee (2018) has also investigated the experiences of the women in the work life, and in this case especially the women who had managed to advance from technical IT roles to the senior executive IT roles. She interviewed the women with the aim to understand how individual and organizational factors affected the career progression of the women and if their gender had had any impact in the journey. Even if some of the results supported the existing knowledge of the career barriers of women, the results were various and very different between individuals, and largely dependent on the company and its culture. The main finding McGee (2018) presents in this study is that women and their career paths are very different. She criticises the common intents of fixing the diversity problem by providing women tools for advancement such as mentorships and leadership trainings, or by counteracting the structural barriers with actions such as transparent promotion practices and ensuring that also minority group members will be taken as candidates. She argues that these practices do not question the organizational traditions and practices which play a big role behind the current state of gender diversity in IT companies. Therefore, she (McGee, 2018) suggests that practitioners would go beyond the numbers and seek for understanding of the root problems of each problem in their real context, and in the end commit to creating an inclusive and diverse culture in the company.

In the literature the organizational culture of IT companies has been described as unique, largely white, male-dominated, anti-social, individualistic and competitive (Tapia & Kvasny, 2004). In studies women have reported that they felt at the time of career entry and advancement that they needed to demonstrate their abilities more than men, they needed to adapt themselves to fit the male-culture, and if they faced problems it was often judged to be their own fault, not a problem in the environment (Schnittker, Ettl, & Welter, 2018). So called “*old-boy*” culture has been said to exist in the upper levels of most IT organizations. The women who have managed to get to that level often complain that they do not fit in even though their ideas would be respected. (Soe, Guthrie, & Yakura, 2009) Also a lot of is expected from the employees of this field: they should be tireless pioneers and prioritize the work over the other things in life. This type of organizational culture has been said to have the potential to exclude women and other minorities if they do not blend in. (Tapia & Kvasny, 2004.) On the other hand women have also reported that their gender has been an advance for them at some situations (Schnittker et al., 2018).

In order to understand the challenges of women in IT, it is crucial also to understand what the women actually want from their career, what are the values and motivations of the women IT professionals (Quesenberry & Trauth, 2007). According to a more traditional view women in IT have basically two career orientations: technical and managerial (Igbaria, Greenhaus, Jeffrey, & Parasuraman, 1991). However more recent views present that the two orientations are not mutually exclusive and the career orientation can as well be a mix of these two (Joseph, Ang, & Slaughter, 2005; Quesenberry & Trauth, 2007). Women’s careers can have also different career anchors, factors that are important, but are not constant throughout the whole career. A desire to balance work with other life for example can be extremely important at the time when women have young children, but become less important when the children age. (Quesenberry & Trauth, 2007.) Most importantly, the literature suggests that those employees whose career orientations are in line with their role in the company are generally more satisfied with their job and career and are less likely to leave the company (Igbaria et al., 1991). This suggests that it is important to recognize and value the different career orientations of individuals for the retention and advancement of women.

In addition of all these organizational and individual factors of women, also the general culture of society, economical situation and public policies have been identified to impact the experiences of women in the IT field. Cultural factors such as the existing attitudes and values regarding women and especially women working in IT do have different effects on different individuals. (Trauth, Quesenberry, & Yeo, 2005.)

As a conclusion of the factors affecting the retention and advancement of women in IT there is a large body of literature with various viewpoints for the topic. Many of the recent studies emphasize the individual differences of women and the context of the study, and do not want to generalize results from their empirical studies (McGee, 2018; Trauth, Quesenberry, & Yeo, 2005). More recent research reports also follow the recommendation (Hyde, 2014; Trauth, 2013) of not over emphasizing the gender differences between women and men (Gammal & Simard, 2013; Holtzblatt & Marsden, 2018a). A lot of different actions have been already done for fixing the problem of low retention and career challenges of women, and the current methods have received criticism for not having the hoped effect. (McGee, 2018.) Some of the approaches and actions from the literature for the retention and advancement of women in IT have been presented in the following chapter.

2.4.4 Approaches for the retention and advancement of women

As described in the chapter 2.4.2, the literature suggests that the underrepresentation of women in IT is a problem because of both humanitarian and financial reasons (Stout & Camp, 2014). The most obvious motivation for companies to do diversity and inclusion efforts is the legal one as the gender-based discrimination of employees is illegal (Act on Equality between Women and Men, 1986; Welle & Heilman, 2005). However, the companies must show that they are doing efforts for the diversity also because they otherwise would be judged of not even trying (Hunt, Prince, Dixon-Fyle, & Yee, 2018). Establishing diversity programs is a common method of organizing the efforts and most companies today do have a diversity program. The content of the programs however varies between the companies (Welle & Heilman, 2005). Different interventions are usual content of diversity programs in companies. So called women affinity groups, which provide educational, professional and networking opportunities for women, have been established in most big IT companies. (Annabi & Tari, 2018.) Other commonly reported gender diversity interventions in IT companies are building a culture which supports diversity, providing professional development opportunities and providing flexible work arrangements (Annabi & Lebovitz, 2018).

Often in the literature biased attitudes and behaviour have been raised as the main reason for the gender discrimination (Milliken & Martins, 1996; Moss-Racusin, Dovidio, Brescoll, Graham & Handelsman, 2012). One way to measure consequences of one's attitudes is conjoint analysis. The conjoint analysis technique has been used in marketing research for more than 35 years. It can provide empirical insight into hidden preferences which are not operated in conscious awareness. In a study of Caruso, Rahnev and Banaji (2009) conjoint analysis was modified to the use of capturing biased attitudes. In the study participants first needed to finish a series of 24 pair-wise comparison questions. Then they rated 24 individual profiles of potential teammates and estimated how likely they would choose the persons of the profiles as a teammate. Finally, participants were asked to rate attributes of teammate on how important they are for the participant. One of the attributes in this study was weight of the person. Even if the participants stated in the last step that the weight had little or no impact on their teammate decisions, still in the results of conjoint analysis weight accounted for more than 25% of the variance in the preferences. (Caruso, Rahnev, & Banaji, 2009.)

Another common method to capture biased attitudes is Implicit Association Test (IAT) developed by Greenwald, McGhee and Schwartz (1998). The computer-based program asks the user to quickly categorize words and pictures to assess if the user has automatic association between concepts. According to Howell and Ratliff (2017) people generally think that their thinking is less biased than the thoughts of others. This is a common for us humans, because it helps us to feel good about ourselves, and that is why we may react defensively to unexpected results of IAT feedback. The defensive reaction may even prevent people from making efforts to change the stereotyped thinking. Howell and Ratliff (2017) argue that this is why it would be a good idea to combine also some type of bias education with the Implicit Association Test.

Spotting biases is possible with such methods as Implicit Association test and conjoint analysis, but the literature shows evidence that the existing biases of individuals can be also modified through diversity education (Rudman, Ashmore, & Gary, 2001). However, educating individuals is not the most effective diversity action according to others. Herring (2009) argues that establishing the organizational responsibility for diversity has been found more effective than reducing managerial bias through diversity training or reducing social isolation through mentoring women. Also, Bohnet (2016) suggests using

behavioural design de-biasing the whole company instead of individuals to promote gender equality. She argues that de-biasing companies can be done with low cost and high speed and the impacts can be big. It might also be that some organizational efforts for gender diversity and equality have been done recently in many IT companies unintentionally. In software development the agile development approach has become very common and multiple scholars (Hazzan & Dubinsky, 2006; Weilemann & Brune, 2015) suggest that it is good for gender equality and the representation of women in the decision making in IT companies. The agile approach emphasizes strongly communication and information sharing. Weilemann and Brune (2015) presented empirical evidence that the management style of women matches better the requirements of a manager in agile development. However, it has also been argued that the usual characteristics of women leaders, listening, supporting and encouraging others, can be employed as well by men in leadership positions. Therefore, Hazzan and Dubinsky (2006) argue that agile software development has the possibility to encourage gender equal participation, not only the participation of women. Anyway, the literature seems to support the suggestion of Tapia and Kvasny (2004) which was to combine both individual efforts and institutional changes for the best results of retaining women and other minorities in IT companies. Behind the efforts should be the aim to change the nature and perception of IT from the current white male culture to inclusive for all. (Tapia & Kvasny, 2004.)

However, the success of the current diversity training programs has been modest and the goals are rarely reached if there even is any (McGee, 2018; Vehviläinen & Brunila, 2007). The content of diversity programs is not always well defined or linked to actual goals, behaviours and performance measurements (Annabi & Tari, 2018; Welle & Heilman, 2005). The obscurity of the practices may make the situation even worse in some cases. For example, if the company over emphasizes the important of increasing the amount of women, they may end up hiring incompetent women which may ruin the reputation of all women. (Welle & Heilman, 2005.) Also, if the goals of the diversity efforts are not communicated clearly in the company, the efforts may be misunderstood and therefore raise negative reactions in employees. (Annabi & Tari, 2018.) Holtzblatt and Marsden (2018b) argue that even if the companies spend a lot of time and money on addressing the workplace issues and retention, the traditional approaches are not working, and it may be that they do not address the actual issues. The most recent approaches for solving the retention and advancement issues of women have included the consideration of the individual differences of women. Annabi and Lebovitz (2018) argue that the individual differences between women and their individual coping methods with different challenges at work should be considered in the design and assessment of organizational interventions. According to their instructions when designing the interventions, it is important first to understand the individual experiences and barriers of women, and then to understand the interplay between the barriers and the interventions. Quesenberry and Trauth (2012) have also emphasized that considering the variety of different career anchors of women is crucial and the interventions in companies should be flexible to be suitable for all women. The “one size fits all” solutions are not good as they often just reflect the stereotypes about women in IT. (Quesenberry & Trauth, 2012.)

The lack of efficiency of the current methods has raised the interest to develop methods which support the measurement of the current situation in the real context and then employ interventions which are suitable for the particular situation in the context. To retain women in the IT companies Holtzblatt and Marsden (2018a) argue that it is critical to understand some dimensions of work first. Based on the six critical factors (in chapter 2.4.3) Holtzblatt and Marsden (2018a) suggest measuring eight work related scales to assess the work experience of women: The overall work experience, the experience of the

team, whether the projects are stimulating and impactful, the support and push received from managers and team members, whether there are enough local role models, whether the participant feels being a manager is attractive, the experience of getting flexibility from work to balance work with other life, and the experience of personal power and capabilities. This type of measuring helps to identify the areas which need more attention and interventions. With this study Holtzblatt and Marsden (2018a) are also providing information for further studies which have the aim of developing workable interventions for organizations. Also, Welle and Heilman (2005) suggest that the best strategy to reduce formal gender-based discrimination is to get accurate and objective information about organizational members, and then apply that information to decision-making processes. Therefore, Welle and Heilman (2005) suggest the following actions for companies: make the decisions of recruiting based on accurate knowledge of the job, hold the managers responsible for making bias-free decisions, use structured evaluation techniques, support formal mentoring by creating processes to build the relationships, and define the links between diversity programs and objectives such as performance.

3. Research problem and methodology

This chapter contains the descriptions of the Case company, the research problem, the used research methods and the procedure of their implementation. As a whole, this study was a qualitative mixed method study, in which both qualitative and quantitative data were collected for the analysis. Combining survey and interview methods enabled collecting information representing a wider population of IT employees but also to deepen the understanding for the multidimensional research questions.

3.1 The Case company and the research problem

The Case company is a large-scale multinational IT corporation of which headquarters are situated in Finland. The study was conducted in one of the sites of the company in Finland with the local software development teams. The origin of the research problem of this study was the Case company's women's affinity group's wish of conducting a thesis research about the gender diversity issue, and whether women were facing career path challenges. The current situation of gender diversity was seen as a problem in the Case company and there was a need to investigate if the career development opportunities were as much available for both men and women in the organization. In October 2016, 25% of the whole workforce of the Case company in Finland were women. Out of the recently hired personnel in permanent positions (between January 2015 and September 2016) 30% were women. (Internal documents of the Case company, 2017.)

The data collection for this study was limited to only collecting the data from the employees of the local site. The previously collected company statistics were not available for this study which affected the approach for the research problem and the choosing of data collection methods. Even if the general statistics suggest that the main problem behind the gender diversity issue of IT companies is the low number of women candidates applying for the jobs (Suomen virallinen tilasto, 2018b), within the limitations of the study, it was justified to study the possible gender diversity issues inside the company. Therefore, the other problem behind the gender diversity issue, the retention of women, was chosen in the focus of this study. The literature presents that retention concerns not only the ability of getting the women stay in the company, but also the career advancement of the women and their upward mobility in the company (Tapia & Kvasny, 2004). The literature has provided evidence that gender-based discrimination is common in the IT companies (Funk & Parker, 2018) and it might be a reason behind the underrepresentation of women (Moss-Racusin, Dovidio, Brescoll, Graham & Handelsman, 2012). Gender equality is also one of the central concepts of this study as the principles of the gender equality is, among other elements, largely about preventing the gender-based discrimination (Act on Equality between Women and Men, 1986).

To facilitate the data collection and analysis gender-based discrimination was divided into formal and informal discrimination as in the literature (Welle & Heilman, 2005). Because the data collection was limited to only collecting the answers from the employees of the software development teams with methods such as survey and interviews, the focus of the data collection is on the experiences and perceptions of the employees regarding gender equality and the formal and informal forms of gender-based discrimination. The generated research questions for investigating the gender-based discrimination are:

What kind of gender-based discrimination is there nowadays in software development of large-scale IT companies?

- a. How men and women experience and perceive gender equality in their working environment?*
- b. How men and women experience and perceive topics related to formal discrimination?*
- c. How men and women experience and perceive topics related to informal discrimination?*

In the next chapter the chosen methods are briefly described, as well as the implementation of the methods in this study.

3.2 Research methods and procedure

As described in the chapter 2.4.1, recent literature suggest moving away from using the positivist epistemology in studies which focus on the descriptive type of investigation of gender differences. Positivist studies can strengthen the gender stereotypes. Instead the literature suggests using more interpretive and critical approaches. (Trauth & Howcroft, 2006.) Still this study was a combination of the positivist and interpretive investigation approaches. This is because there was no previous data available for the use of this study regarding the topic of discrimination in this particular context. However, well-grounded critical studies can be later built on the knowledge provided by studies like this.

In summary, the survey method represents traditionally the quantitative approach in which the focus is on measuring the amounts of for example the characteristics of people. In contrast, the interview method represents the qualitative study which focuses on describing the characteristics without comparing them in terms of measurements or amounts. (Murray, 2003.) In this thesis both research methods, survey and interview, were conducted in qualitative manner, with the objective of providing descriptions of the phenomena.

3.2.1 Survey

In this study the aim of conducting the survey was to provide information most importantly about the existence of different types of discrimination and equality issues. The questions were about the subjective experiences and perceptions of the respondents as it was best for the reliability of the results that everyone spoke only for themselves. It was important to collect the responses from both men and women to be able to point out the possible gender-based issues later in the analysis by using the gender as an independent variable.

The whole survey with the instructions and all the questions can be found as an attachment in the end of this thesis (Appendix A. Survey questions). The survey consisted of altogether 33 questions in which there were three open answer questions, 11 Yes/No questions, 17 multiple choice questions and two Likert-scale questions. These types of open and closed format questions are typical in surveys (Walliman, 2006).

In the investigation of the existence of gender-based discrimination and equality issues the survey helped in various ways. There was one question directly about the perception of the current state of gender equality (question 29). Also, there was one question (question 31) where it was asked if the respondent felt that his or her gender had been an advantage or a disadvantage in different situations at work. Otherwise the questions were

not directly about gender, but about general topics related to the career, career advancement and work experience. A survey about the subjective experiences of participants is not a best method to study whether there are formal types of discrimination and in what extent. Instead the company statistics can reveal differences in salaries and career advancement. This survey however can provide important insight which can explain the possible differences in career advancement of men and women: the past career history (questions 12-14), happiness with the current role (questions 7-9), current career interests (questions 10 and 11), and the willingness and interests regarding the advancement on the career (questions 15-26).

Unlike with the formal discrimination, the existence of the informal discrimination could be well investigated with the survey as this type of discrimination is related to the relationships and the quality of the relationships in the workplace, as well as the daily working experience. The questions 27 and 28 were about bullying in the workplace, and the question 30 was a set of statements regarding the relationships and the daily working experience. All of the questions could also provide more insights on the needed actions for improving gender equality and diversity.

Implementation

The survey was sent to 371 employees in two internal software development and testing organizations in the Case company. There were 68 women, which was 18% of all the employees who received the survey. The two organizations consisted of multiple software development teams in which there were both technical and managerial personnel in various roles. Personnel in other types of roles were excluded from the survey. They, for example the assistants of the organizations, had a possibility to answer the survey, but their responses were afterwards filtered out based on the job role question (question 6).

The survey was reviewed several times before the implementation by internal personnel of the Case company and external people such as the supervisor of the thesis study to make sure that the answering the questions would stay within a reasonable time and to ensure that the questions are clear and understandable. Also, the internal legal department and personnel with expertise with internal surveys were consulted in the Case company to make sure the survey would follow the required practices to ensure the anonymity and privacy of the employees.

The survey was sent to the employees by email with a brief introduction and a link to the survey page provided by Microsoft Forms web service. The survey was available for the respondents for 12 days, and during the time they were sent reminders. A human resources department representative was nominated to export the survey data and do a final review in case of a need for deleting data which could harm the anonymity and privacy of the respondents.

The analysis of the survey data was descriptive in nature (Walliman, 2006). Frequency distributions, with the gender as an independent variable, were derived from most survey question showing the percentages of the total cases among men and women. It is common to ease the reading of frequency distributions with bar and pie charts (Walliman, 2006), which were utilized also in this analysis.

Those questions which were open, collected text answers from the respondents. Content analysis was executed for the text data. It is a way of gauging the importance of phenomena by counting the frequency of it in the case (Walliman, 2006).

Later the analysed results of the survey (chapter 4.1) were further analysed together with the interview results. This analysis will be presented in a form of tables in the discussion chapter (chapter 5).

3.2.2 Interviews

Interviews were planned to be conducted with only women to get more insights of the possible career challenges and other topics related to the career advancement of the women. The interview questions were based on the findings from the survey and the prior literature. The findings from the survey called for further investigation of the themes of bullying and gender equality. Also, other topics related to informal discrimination got more attention in the interviews. A theme from the literature, individual differences between women, were further investigated in the interviews. The investigation of formal discrimination was not in the focus of the interviews as the results of the survey suggested that it could be the best to look for more insights for this topic from the statistics of the Case company.

The interviews were planned to be semi-structured (Walliman, 2006), containing standardized and open format questions and having partially structured procedure. The themes and the questions to be discussed in the interviews were all planned before, but there was no need for a strict procedure, and therefore there was no reason to make the interviews fully structured. Instead the aim was to make the interviews relaxed situations with the questions only guiding the discussion and the flow of thoughts.

There were about 14-16 questions in the interviews depending on the answers of the respondents (Appendix B. Interview questions). The first three questions were rather basic questions about the job profile of the respondents: the years of experience in the Case company and in the industry, and the current job role and the team of the respondent. The next questions were about career and career goals. The aim behind these questions was to discuss first about familiar and comfortable topics to create a relaxed and safe atmosphere for the interview, but also to investigate the individual differences and similarities between the women interviewees. Question 9 was about the perception of gender equality. According to the survey results women estimated the gender equality in their work community not as good as men (chapter 4.1). Therefore, the interview aimed to find answers what are the gender equality issues behind these results. The questions 10-13 were focused on the topics related to informal discrimination: work community and the interpersonal relationships. These types of topics often require deeper investigation with broader understanding, which is the reason they were further investigated in the interviews. Probably the most staggering survey results were about bullying at work, which was experienced by 40% of the women and 10% of the men (chapter 4.1). The high number of women was unexpected and unfortunate, which was why the topic needed more investigation. The planned questions for the further investigation of the bullying included questions such as when the bullying has occurred, and what kind of bullying have the women experienced. Finally, the last question was what actions the Case company could do to improve gender equality. The aims of this question were to summarize the interviewee's thoughts of the gender equality in the workplace, and to gather insights of the actions the Case company could do to improve the gender equality.

Implementation

After the survey, an announcement about the upcoming interviews was sent to the women (68 women in total) of the same employee group who also received the survey earlier. In the announcement, the themes of the upcoming interviews were described beforehand, as well as roughly the procedure of the interviews. Volunteers who had been working at the case company at minimum 2 years were asked to sign up by contacting the author directly. 7 of the volunteers were invited to the interviews in the order they signed up, two interviewees (15% of the women in the organization) from Organization-1, and five (9% of the women in the organization) from Organization-2. Seven was considered a good sample size for the interviews since it was possible to get various participants from both internal organizations, and it allowed different individuals to be heard, but still, it was small enough sample size in order to make a good qualitative analysis of the results.

The participants were asked to book an hour of their time for the interview, even though the estimated duration of the interview was announced to be about half an hour. The average duration of the interview was 45 minutes. This time included also the review and agreement of the interview procedures which was in the beginning of each face-to-face interview.

The procedures included informing that the interviews were recorded for the later analysis. The participation for the interviews was confidential, which meant that only the author would know who have been interviewed. Some practices to ensure anonymity were also informed for the participants. One of these practices of this study is to keep the comments of individuals separate from the job profiles of the individuals, including job role, internal organization, years of experience in the industry and in the Case company. It was also informed that some comments of individuals could be modified if the interviewee herself would be easily recognizable. The written information about the interviews was handed over for each interviewee in case of for example a need to contact the interviewer to deny the use of some statements.

After the interviews the recorded audio were written in text form. Data reduction (Walliman, 2006) was done already in this phase, the content which was not related to any of the interview questions or the topics of the interview, were not written for the later analysis. All the written mass of text was then categorized clearly under each of the interview questions. Still the amount of text was too massive to comprehend, and therefore the content was coded to represent different types of answers. Again, the content analysis was utilized by counting the frequencies of certain types of answers. Even though the idea of qualitative analysis is not focusing on the measurements, still the numbers can show importance of the phenomena compared to others (Walliman, 2006).

4. Results and analysis

In this chapter the analysed results of the survey and interviews are presented. Survey results (chapter 4.1) provide measurements and more generalizable information about the experiences and perceptions of respondents who work in software development. Interview results (chapter 4.2) are not that much about the measurements, even though more frequencies of typical answers have been mentioned. The aim of the interviews is to provide descriptions of the phenomena and deepen the understanding of the possible issues, frequencies may tell about the importance of the findings.

The analysed results of the survey and interviews will be later combined and categorized in tables presented in chapter five. Heavy data reduction was made also for presenting the results in the forms of tables. Therefore, to thoroughly understand the findings I consider that it is important to study the results in the wider form presented in this chapter.

4.1 Results of the survey

Here, in the analysis of survey results gender is used as an independent variable and the percentages represent therefore each group separately, men and women. Despite the limited space the aim has been to present the charts in easily readable form, therefore the scale of some bar charts is not up to 100% but lower.

The response rate of the survey was 52% (193 responses) of the whole 371 employees who received the survey. The answers of other than technical, managerial and both technical and managerial personnel are not included in this analysis. The response rate of women was 69% and of men 48%.

The share of men and women who considered their role as technical and managerial was rather even. 71% of men and 70% of women of the respondents considered their job role as technical; 14% of men and 19% of women considered their job role as managerial; and the rest 14% of men and 11% of women considered that they are in a both technical and managerial job role.

To ensure the anonymity of the respondents, indirect identifiers, in this case such as organization, years of working experience in the industry and in the Case company and years of being in the current role, were excluded of the analysis of the results. The indirect identifiers are not such that can endanger anonymity as individual information, but when considering the rather small size of the sample, the anonymity might be endangered when many of these indirect identifiers are combined. The topic of formal and informal discrimination was considered so sensitive that the risk of identifying individual respondents needed to be minimized.

Mostly the respondents considered that their current role matches well with their education. However, a larger share of men, 78%, considered that their education matches mostly to their current role, whereas the share of women was 64%. Instead more women (30%) than men (20%) reported that their education matches their role partly. The rest 6% of women and 2% of men felt that their education did not match their current role at all.

A clear majority of the respondent had not been reassigned within the organization with job rotation or regularly organized resource balancing reviews. However, a larger share

of women than men reported that they have been reassigned within the company with these actions. 19% of women and 6% of men had been reassigned with job rotation, and 26% of women and 14% of men had been reassigned with the regularly organized resource balancing reviews. It seemed that in about half of the cases the change of the job with the regularly organized resource balancing review did not affect the job role of the employee. In these cases, the job role did change for 42% of women and for 52% of men.

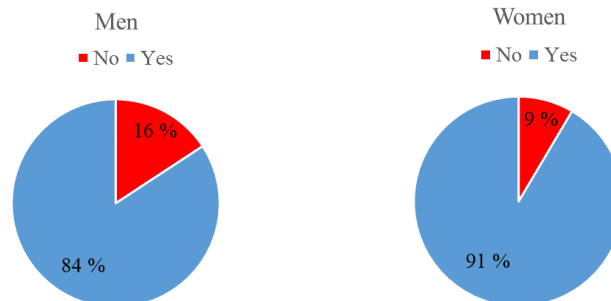


Figure 1. Being satisfied with the current role.

The share of women satisfied with their current job (91%) was larger than the share of men (84%) (Fig. 1). The answers regarding being inspired with the current role were similar between men and women. 23% of both groups were not inspired with their current role.

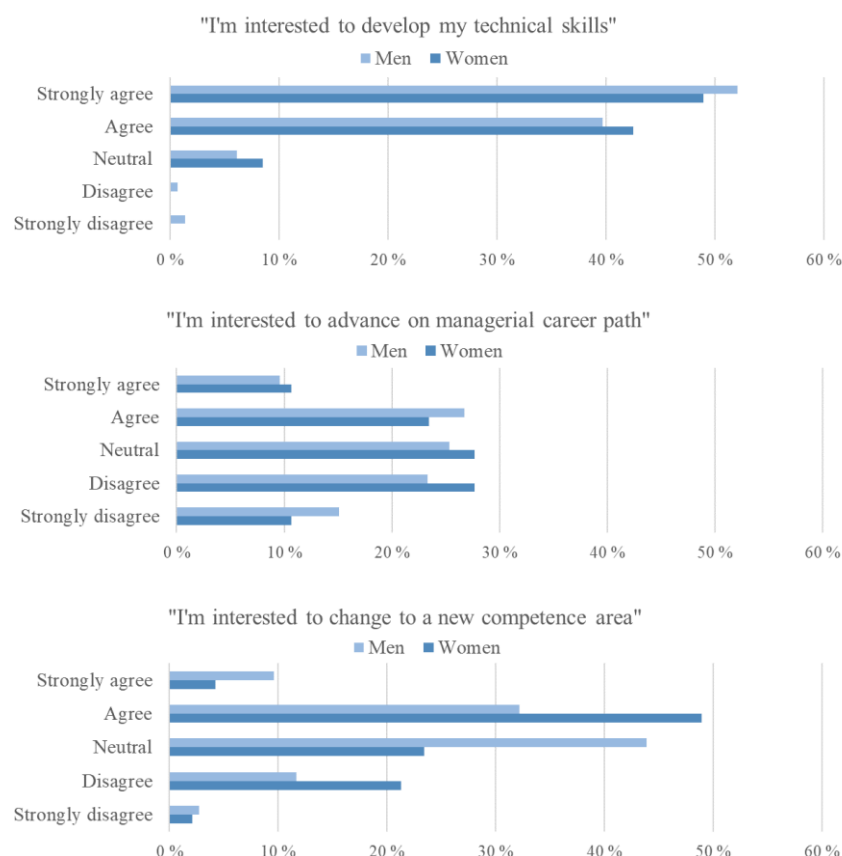


Figure 2. Career orientation interests of the respondents.

Figure 2 represents the career orientation of women and men regarding interests in managerial career path, technical skills or changing to a new competence area. The responses of men and women are very similar about the interest towards developing

technical skills and advancing on the managerial career path. Majority, over 90%, are interested in developing their technical competence, whereas advancing on managerial career path is an interest of about every third respondent. The interest of changing the competence area divided opinions slightly between men and women, as slightly more women agreed or disagreed about this at some level, whereas more men had neutral thoughts about this topic.

60% of women and 64% of men reported that their current career orientation matches well with their current role in the organization. Just 1% on men answered, “not at all”, and the rest 40% on women and 34% of men considered that there is a partial match.

Respondents’ activity to seek for new job inside the Case company was mapped with a question of when the last time was, the respondent applied for a new job, if at all. According to the responses women have recently been more active. 15% of women had applied a new job inside the company within the last year and 34% within the last five years, whereas 10% of men had applied a new job inside the Case company within the last year and 20% within the last five years. 21% of women and 31% of men had applied a new job more than five years ago. Rather large share of women (30%) and men (39%) had not applied another job at all. (Fig. 3)

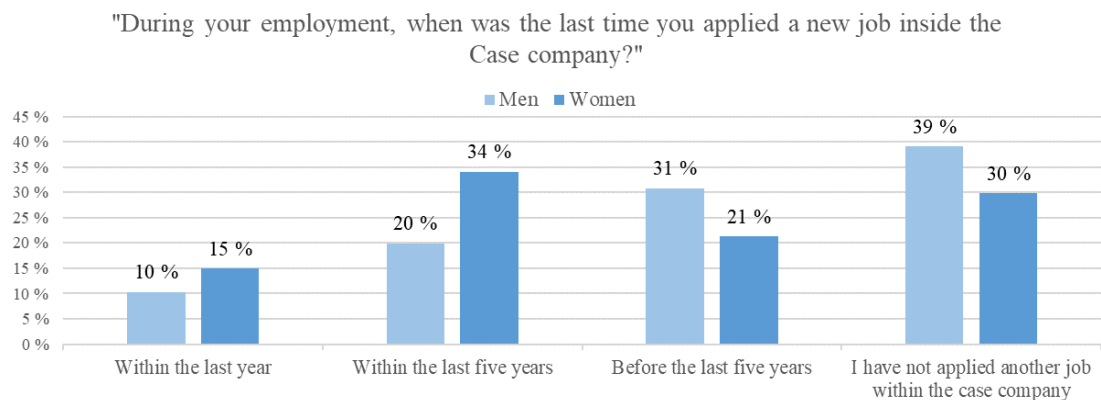


Figure 3. Last time of applying for a job within the Case company.

Of those respondents who had applied a new job within the last year or within the last five years, about half had applied a job which was on the upper level compared to their current role at that time. The share of both women and men who had applied an upper level role was 48%.

Those respondents who had not applied a new job at all, or had applied a new job more than five years ago, had various reasons for not applying, and they had a chance to give several reasons for their answer. Three reasons were suggested in the survey form: “*I have been happy with my current job*”, “*I have been busy with other things in life*” and “*There have been no interesting job opportunities available*”. Those three were the most commonly reported reasons, but there were also differences in the rates between genders. The main reason for men (69%) was that they had been happy with their job. 28% of men reported that there had been no interesting job opportunities, and 19% had been busy with other things in life. Being happy with the current job and being busy with other things in life were the most reported reasons among women as they both were reported by half (50%) of the women. 21% of women reported that there had been no interesting job opportunities available. 11 open answers were also submitted by the respondents, which included such as they had been requested to a new role and that is why applying had never been necessary, the respondent has just recently started working in the Case company,

the respondent prefers staying in the current team because the current line manager is great and the respondent feels that leaving is difficult because the team is already too small.

Figure 4 represents the share of all respondents who were interviewed for a new job position during the last year. According to the results 17% of men were interviewed even if only 10% of men had applied a new job (in Figure 3). In contrast the share of women, who had applied for a job (Fig. 3) and who were interviewed for a new job (Fig. 4), were even, 15%. Out of those who had been interviewed for a new job during the last year, most were selected into the position. Only 14% of women and 11% of men were not selected.

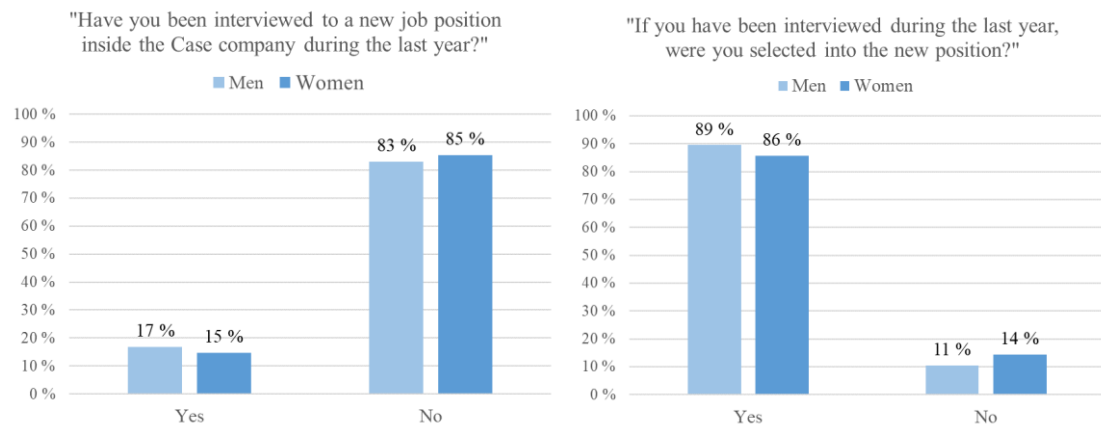


Figure 4. Responses regarding being interviewed to a new job position and being selected into the new position after the interview.

Respondents had mixed preferences about leveling up in the Case organization. (Fig. 5) Approximately half of the respondents were planning to level up sooner or later in the Case company. There were some differences between the answers of men and women as more men were planning to level up in the near future, whereas more women were planning to level up sometime later. Overall slightly more women were planning to level up compared to men.

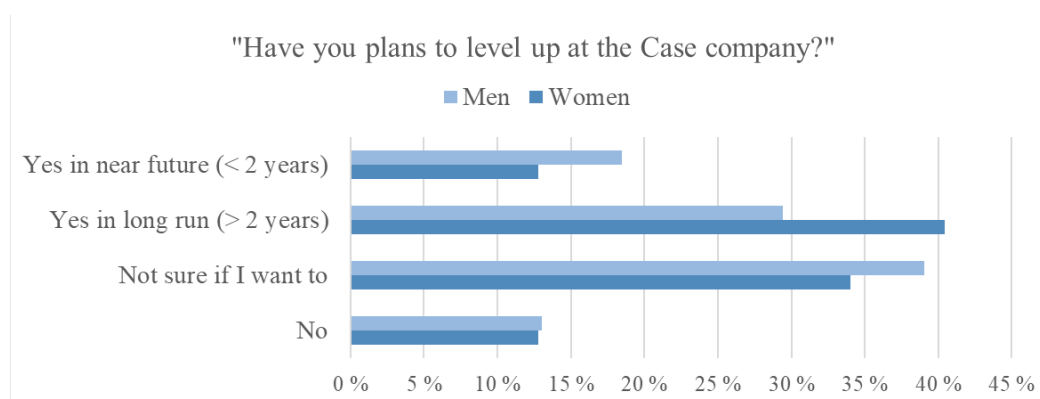


Figure 5. Preferences of respondents about leveling up in the Case company.

Most of the respondents think that the Case company has opportunities for them to fulfill their personal career aspirations. 77% of women and 79% of men were positive about this. 11% of women and 14% of men thought that the topic was not relevant for them. Those few men and women who did not feel that there are suitable opportunities for them,

reported reasons such as interesting positions are not open for everyone, personnel and roles are not changing, at certain point the competence and results are not rewarded anymore, and there just are not things that the respondent is looking for.

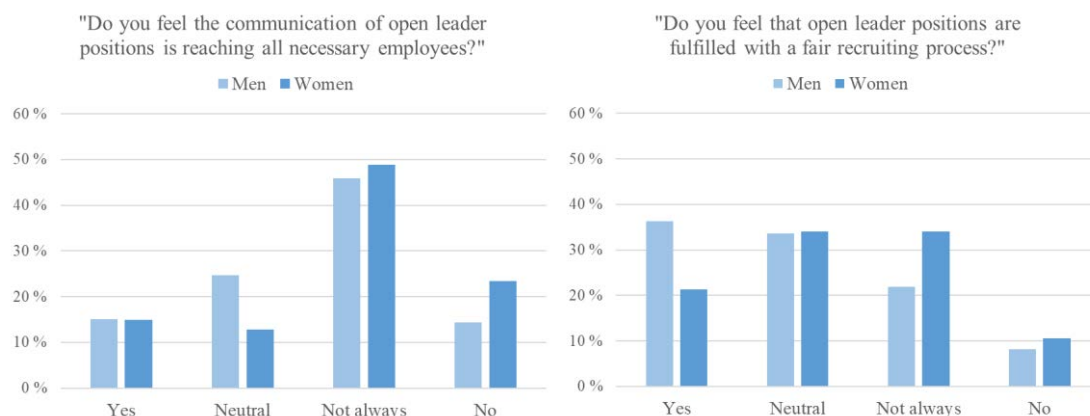


Figure 6. Responses regarding the communication and the fulfillment of open leader positions.

In Figure 6 the responses regarding the fairness of both communication of open leader positions and fulfillment of open leader positions are presented in charts. Almost half of the respondents reported that the communication of the open positions does not always reach all necessary employees. The responses were more positive for the question regarding the fulfillment of the open positions. Most of the men considered that the recruiting process is fair, but majority of the women did not agree.

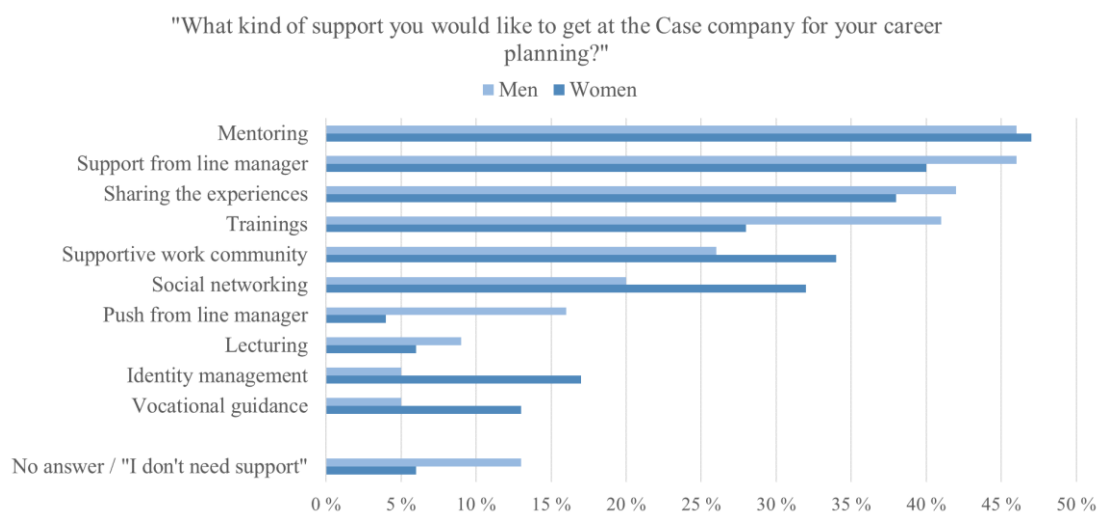


Figure 7. Preferences of support for career planning from the most popular to the less popular.

Figure 7 represents respondents' preferences of those career planning support methods which were listed as options in the survey. Mentoring (89 responses), support from line manager (86 responses), sharing the experiences (79 responses) and trainings (73 responses) were the most wanted support for career planning. However, some differences were in the preferences between genders. Significantly more men compared to women would like to get trainings and push from their line manager as a support for their career planning. In contrast, significantly more women had preferences such as support from the work community and social networking. Also, few other than the suggested options were reported: more job rotation, replacement of the line manager, better communication of open positions, and supporting employees who have studies in addition of their daily

work. 22 respondents reported that they do not need support for career planning or did not answer to this question.

Most respondents had discussed with their current line manager about their career plans. 30% of women and 24% of men however had not. The most reported reason for not having discussed with their line manager was that the respondent had been in the current position only for a while (11 responses). Other reasons were that the respondent feels that there is no need for the support of line manager in career planning, the line manager is too busy or not interested to discuss about this topic, the respondent is happy to continue with the current role, the topic is not relevant right now, the respondent feels that there are no other job opportunities, and the line manager had just changed.

One of the most alarming results of the survey was the high number of women who reported that they have experienced bullying during their career at the Case company (Fig. 8). In the survey the bullying was defined as “*Bullying, Feeling outcast, Depreciation from a colleague or from line manager*”. In the next question several suggestions were offered for the respondents as the assumed trigger for bullying and the respondents had a chance to choose many reasons if they wanted. Gender and opinions were the most reported ones among women. Almost as many times were also reported character and job role by the women who had experienced bullying. The same triggers excluding the gender were also the most reported by men. None of the men who had experienced bullying felt that their gender was the reason for the bullying.

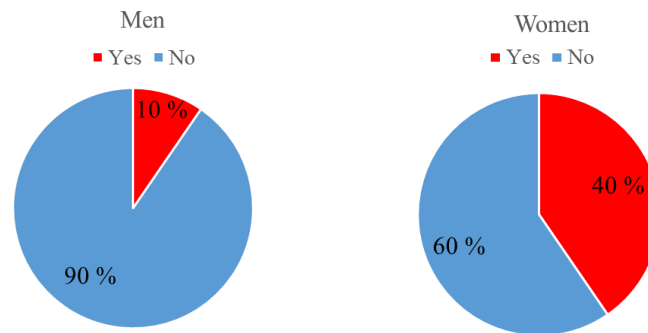


Figure 8. The share of women and men who have and have not experienced bullying at some point of their career.

85% of men consider the state of gender equality very good at the Case company in general, however only 32% of women agree. In contrast 57% of women think that there are slight problems and 11% that there are significant problems with gender equality at the Case company in general. Men estimate the state of gender equality in their organizations even better than in the Case company in general. 93% of men think that men and women are equal at work in their organization. Also, more women think that men and women are equal in their organization than at the Case company in general. However, still only 51% of women feel that men and women are equal in their organization. (Fig. 9)

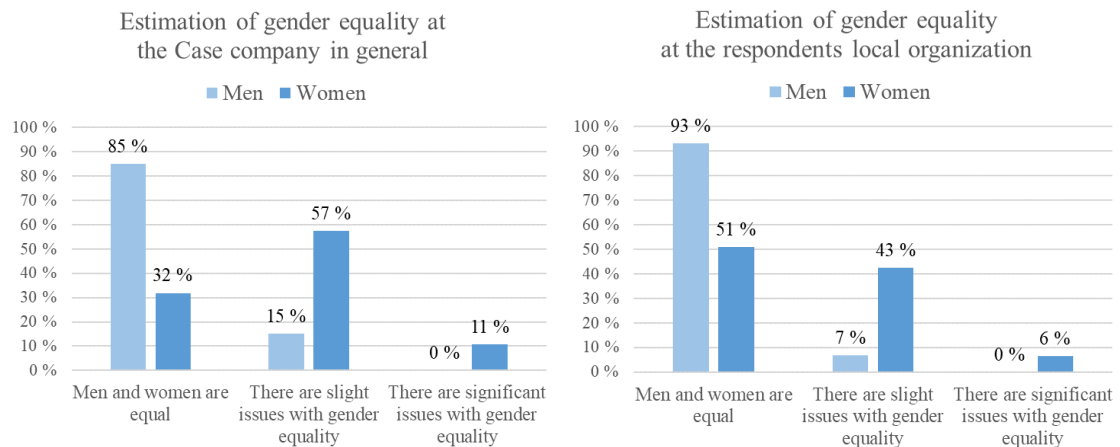


Figure 9. Estimation of gender equality in the Case company in general and in the respondents' organization.

There were several statements regarding the working environment in the survey (Fig. 10). Majority of both men and women agreed at some level that the team spirit is good in their work community, but rather many did not. Many men agreed strongly whereas more women agreed moderately.

Almost all reported that they are able to get help from their colleagues. However again slightly more men agreed strongly compared to women, and few women even disagreed.

Majority of the respondents felt that they are appreciated in their work community. There was slightly more men who agreed with this statement, whereas few women disagreed.

The shares of men and women who agreed about that their expertise matches well with the tasks they get was rather even. However, there were few men who disagreed about this statement.

The statement of getting support from ones' line manager was one of the statements which divided most the answers between men and women. Even though majority of both men and women agreed at some level that they get support from their line manager, there were significantly more men who agreed strongly. In comparison the same share of women answered "neutral" at this statement.

Again one of the statements which resulted in different responses from men and women was the one about the fairness of the management style in the organization. Clearly more men compared to women agreed, whereas more women disagreed or chose the neutral answer.

Majority of both men and women agreed that they are able to influence the decisions regarding their job. Again there was more men who agreed strongly, whereas slightly more women disagreed or choose the neutral answer.

Mostly the respondents agreed at some level that they will not be judged if they need flexibility from work, for example because of family reasons. Almost half of the men agreed strongly whereas half of the women agreed moderately. Despite the positive answers of the majority, there were few men who felt that they are not able to get the flexibility without being judged.

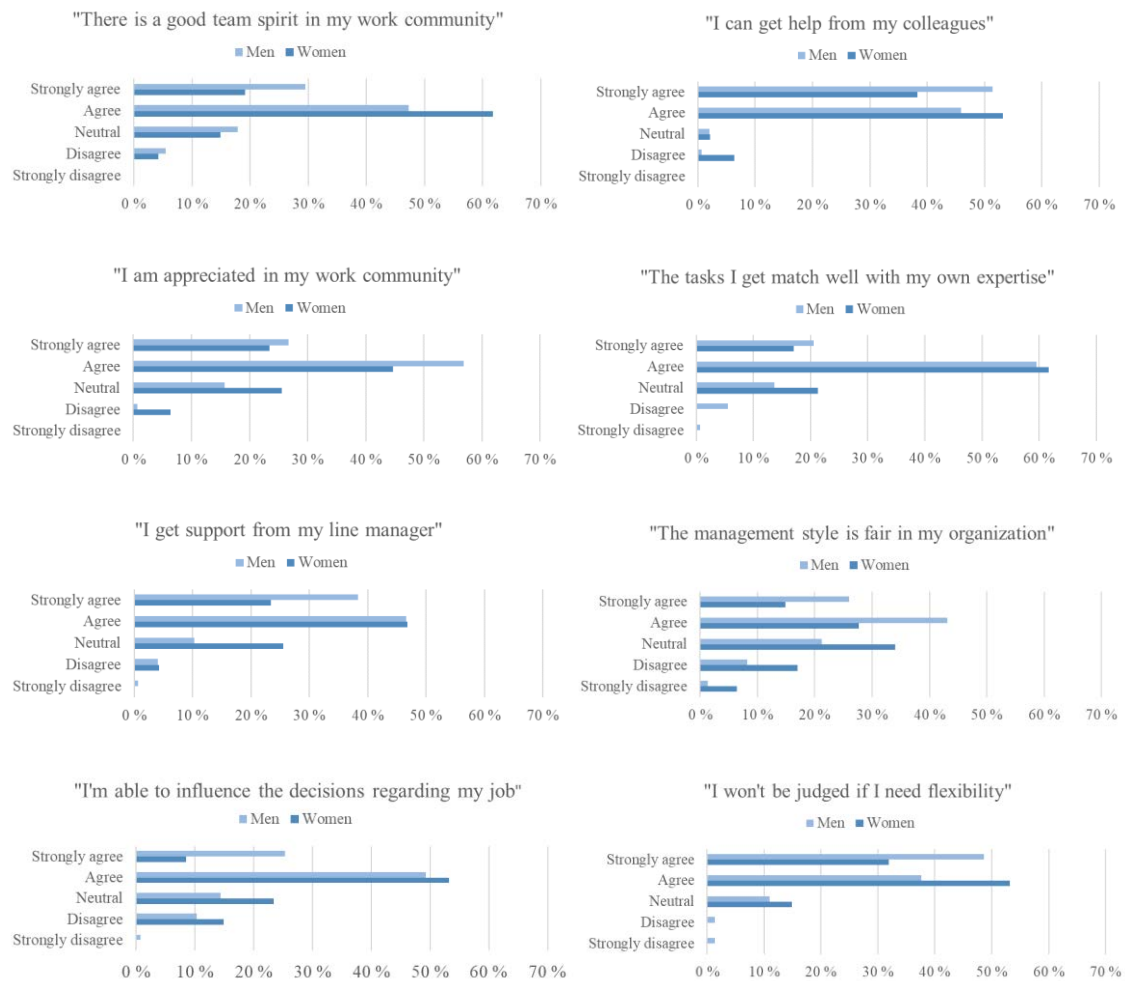


Figure 10. Responses for statements regarding working environment

The respondents were asked if they have experienced that their gender had had any impact regarding seven work related elements: salary, career advancement, possibility to get more training or education, possibilities to get access to information they need in their work, the continuity of employment, the assessment of individual performance, and building informal relationships such as friendships or informal mentorship (Fig. 11). The clear majority of men responded “no impacts at all” for all of the seven questions. In three of these questions also almost as many women as men chose the “no impacts at all” option: possibilities to get training or education, getting access to necessary information and the continuity of the employment. In the assessment of individual performance and building social relationships some women were unsure if their gender has had some impact, but also few felt that their gender has been a disadvantage in these cases. However, the salary and career advancement raised the most divided responses between the men and women. With these questions also slightly more men were unsure of the effects of their gender as well as many women. The most notable thing is that a significant number of women felt that they have experienced disadvantage of their gender regarding their salary and career advancement. Interesting responses are also from the few individuals who responded that their gender has been an advantage with these work related elements.

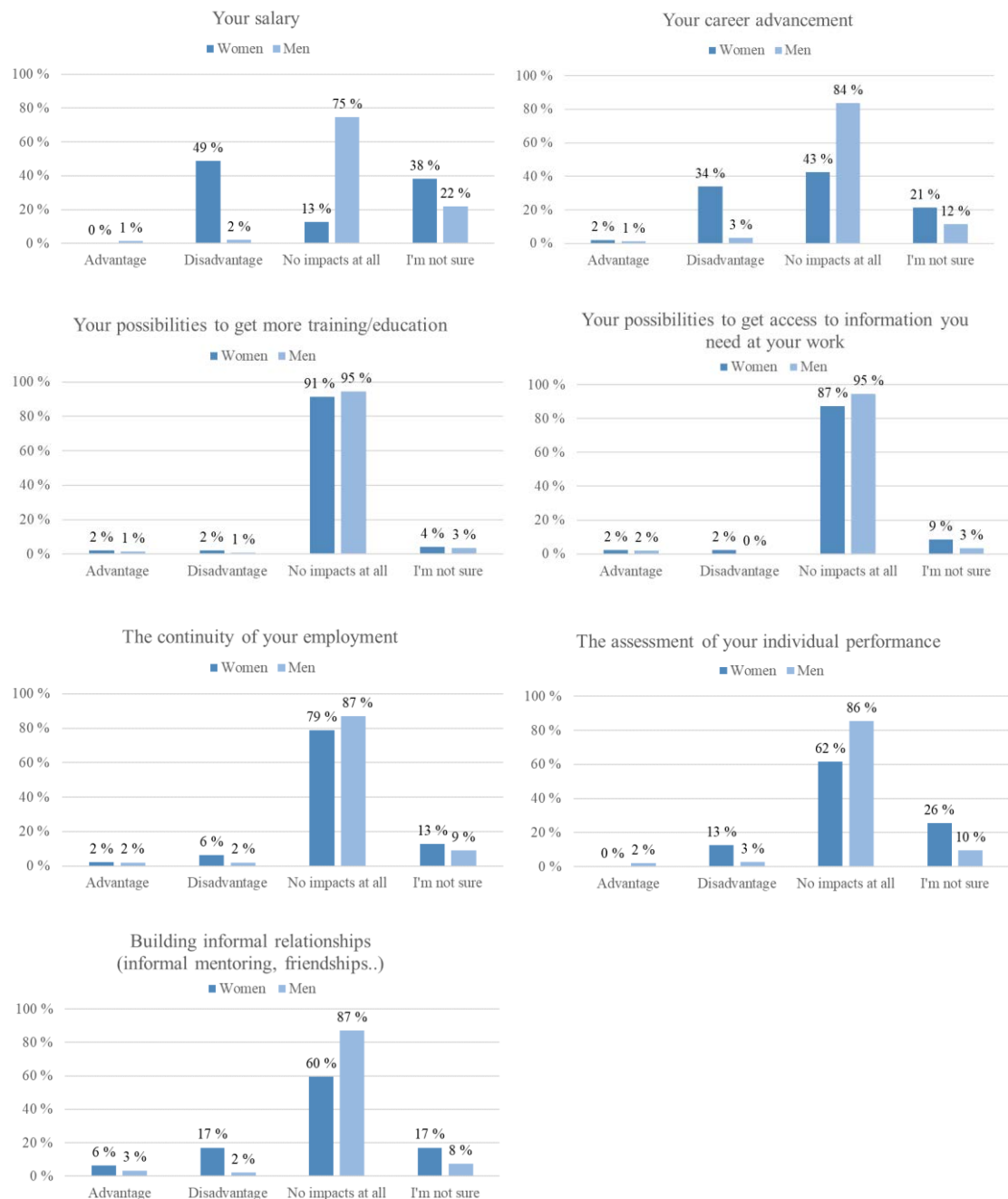


Figure 11. Respondents' estimation of the impact of gender in work related elements.

Feedback for the survey and additional comments were not mandatory, only 21 of all 193 wrote a comment. From the 193 respondents 47 were women and 146 men, and also most of the 21 open comments were from men.

First, the comments from women included feedback for the survey:

“The question regarding impacts of gender in salary and career advancement could have had more scale to respond. I think there are slight disadvantages if you are a woman.”

“I don't think that anything changes even if I report gender equality problems here, but I have experienced that there are gender equality issues in salaries and in job grade promotions.”

Second, only couple of women brought up gender equality issues in the open comments:

“It’s easier for men to get wage increases.”

“Managers deny equality problems because that would be in conflict with [the Case company] values.”

Third, some had things to criticise in the current practices within the Case company:

“Women in [the Case company] think very strongly that quotas are something they don’t want to be a part of, but I think it is preventing the work for better gender diversity.”

“There is too much women in the Gender Diversity network, there should be also men!”

Men brought up also some other topics in their open feedback and comments, but again there were more men in the group of employees who received the survey and among the ones who responded. First, few men commented the necessity of the gender equality research in the Case company:

“The state of equality between genders is in good shape at least in Finland at [the Case company]. I believe that the situation at [the Case company] is much better than in other companies!”

Second, few men wanted to point out that the possible problems in gender diversity are grounded in problems outside of the Case company:

“Please note that there are only few women applying for a job in [the Case company].”

“I would be glad to see more women working in the software industry. However, I think the gender diversity work in [the Case company] is pointless, instead the problem is that young woman don’t want to choose technical career path.”

Third, multiple men brought up different issues related to gender equality in the Case company:

“I answered “No impacts at all” to the question regarding impacts of gender, because there is a risk of a cognitive bias if a man says he’s been favored based on his gender. I think I might have been favoured based on my gender and it bothers me. I don’t think it is ok.”

“I have followed up many women’s salary at [the Case company] and I think that [the Case company] doesn’t pay enough for women. That is not fair.”

“I have experienced a line manager who was very technical and bad at human management. I didn’t see that the line manager was able to work with women or even young men in the team.”

“I have witnessed some inappropriate comments and attitudes towards for example trainees, but I don’t see that they are impacting anyone’s opportunities or equality.”

“I have faced a women leader at [the Case company] who wasn’t acting equally.”

Finally, numerous men gave also positive feedback about the survey, such as:

“Good survey, I hope to see also some actions based on the results!”

The local womens’ affinity group was better known by women employees. Most of the respondents (54% of men and 43% of women) replied that they have heard about the network, but do not really know their activities. 38% of women and 24% of men reported that they know the network and something about their activities. However, only 11% of women and 2% of men reported that they know the network and their activities well, and 9% of women and 20% of men responded that they have not heard about the network before.

4.2 Results of the interviews

Seven women from the receivers of the survey were interviewed in the second phase of this current study. The invitation was sent for all the women who earlier received also the survey and volunteers were asked to contact directly the author.

The summaries of the answers for each question of the interview are presented in this chapter. The interviews were conducted in Finnish, and the responses are therefore translated here in English. The list of the themes and questions used in these semi-structured interviews can be found also in the Appendix B. Interview questions. The themes of the questions are: background information, career and career goals, work community, bullying and harassment, and internal actions for better gender equality.

Background information

1. How long have you been working on the field of IT?

Five of the seven interviewed women had longer than 20 years of experience working in the IT field.

2. How long have you been working for the Case company?

Five of the seven interviewed women had longer than 20 years of experience working in the Case company.

Two of the seven women have worked several years also in other companies in the IT industry. However, the most of their career they had been in the Case company. Other five women have worked only in the Case company, excluding possible internships in the times of studies.

3. How many women and men there are in your current team?

Four of the seven women are the only woman in their current team. There are several other women in the teams of the other three women.

Three of the women who were interviewed were working as technical specialists, two were currently project managers and the rest two were line managers.

Career and career goals

4. Has your perception of the IT field changed during your career at the Case company?

When asking the women if their perception of the IT field had changed during their career, four of the women mentioned that their understanding of the industry has evolved during their career, and they have realized how big and significant the matters they are working for are. Four women brought up that the IT field has become even more competitive, which is visible also within the Case company in the competition between the teams. Also, the rapid evolvement of technology during the years was a topic which over half of the women talked about. Two of the women spoke about constant learning which is according to them necessary in the IT field and which they consider interesting. Couple women mentioned that their work tasks had changed during their career a lot. Two interviewees told that their perception of the IT field had changed during their careers, but also two others told that they already knew before entering the field what it is like to work in the IT industry.

5. Are your career goals different nowadays compared to the time when you were starting your career?

All the seven interviewees had started their career in technical roles. Over half of the women told that they were not interested about the managerial career path in the beginning of their career. However, four of them are currently working as project managers or line managers and prefer to continue on that career path. Some of them ended up in managerial roles because of their own interest which raised during their career, but some were first asked in the role and then found it suitable for them. One of the interviewees had expressed her interests for managerial roles, but so far had not been selected for the training program for managerial tasks. Being satisfied with the job role was not asked in this case, but still five women brought up that they are satisfied with their current job. Couple of the women talked about their motivations, that they have not been especially career oriented or after some titles, but instead they were interested about the work itself, achieving results better all the time and developing their skills. Some of the interviewees wanted to share their thought about what are the factors guiding their career. Couple told that during their career they have learned their own strengths and preferences, but couple also told that they have trusted the opinions of their manager of what they should aim for in their career. One of the interviewees shared her experience that if you are willing to take tasks with special responsibilities you may even end up of having too much responsibility to carry for one person.

6. Have you considered leaving the Case company at some point of your career?

All but one of the interviewees told that they have considered leaving the Case company at some point of their career. Two told that they have also applied a job elsewhere at some point of their career. The reasons have been various for the women who were interviewed: Two women brought up the issues in the team spirit and in relationships between persons, two had felt that they were stuck with monotonous tasks and wanted more variability, other two had applied elsewhere because of the uncertainty of the IT field, and two had been too stressed out because of their work at the time. Also, low salary and unfair career recognitions, the politics and stiffness of a large company, considering entrepreneurship as a career option, and the pressure to apply because everyone else seems also applying elsewhere were also mentioned as the reasons to consider leaving from the Case company.

Despite of their past thoughts the interviewees had stayed in the company. Three different reasons were brought up: Two told that a solution for a problematic situation at that time was found within the Case company in the end, two women told that they have always liked their work so much that the will to stay has been stronger than the thoughts of leaving, and finally couple of the interviewees told that they just like the company and therefore have not decided to leave after all.

7. (If the answer was “No” to the questions 4-6)

Please, tell about your career. What kind of phases there has been on your career?

This question was not discussed in any of the seven interviews since the participants were open and willing to speak about their thoughts related to questions 4-6.

8. (If the interviewee has been working elsewhere than the Case company)

Was the career development somehow different in other companies than in the Case company?

Only one of the interviewees had work experiences from another company which could be compared to the experiences in the Case company. The company was significantly smaller in personnel size and having fewer office sites. The interviewee considered that in a smaller company the career development is more clearly based on the proofs of competence and achieving roles with higher salary and more responsibility happens naturally, whereas in a large-scale company as the Case company the employees need to strive for the career achievements.

Work community

9. How would you describe the current state of the equality between genders in your organization?

Men and women are equal / There are slight issues with gender equality / There are significant issues with gender equality

(If the interviewee does not consider men and women equal)

Please, tell what kind of equality issues you feel there are in your organization?

For this question the first reaction of four women was that they told that there are existing gender equality problems in the Case Company. Two of them described the problems “small” but the two others did not want to label the problems as small or big. The first reaction of the last three women was telling that the state of the gender equality is good and that they have not noticed any significant problems related to it. However, all the three women continued speaking out their thoughts after the first reaction, and they all mentioned at least one gender equality issue.

Three of the seven interviewees mentioned having noticed unpleasant or unacceptable behaviour and attitude towards women in the workplace, three interviewees mentioned that they know, or they suspect that the wage of women is lower than men without good enough reasons, also three women told that they have noticed that women are not taken seriously. Related to the last one, couple of women told that there is a common habit of trusting the knowledge of men, and in situations in which expertise is needed men are always the ones who are asked for advice, even if there are also women with the same or even better expertise. In addition, two women also spoke that they have a feeling that women need to prove their capability more than men, and they need to be even better than men to achieve the same wage and appreciation. One woman mentioned that if there is a

new job role which requires certain type of expertise its always the men who are asked to take the role. Also, one interviewee mentioned that all the managers in her organization happened to be men, but she could not say is it really a gender equality issue, because there is so few women overall. One interviewee was also not sure, but had a feeling, that in the Case company men achieve more management positions in the higher levels of organization because of their networks with other men.

10. Do you feel that men and women have nowadays equal possibilities to create social relationships in your organization, and are the quality of the relationships as good for men and women?

All the seven women who were interviewed expressed that in their opinion men and women have equal possibilities to create social relationships in their organization, and most of the women told that the quality of relationships seems to be generally equally good for men and women. The concept “social relationships at work” was possibly understood in various ways, since some women spoke about friendship types of relationships where they could share their thoughts about work and other life, and some about the capability of working with other people.

Even if all the interviewed women felt that generally there is no gender equality issues in the social relationships at work, they all had some thoughts they wanted share about the topic. Almost half of the women, three of the seven women, mentioned that they have noticed a group of men which have very closed network and roles with power. Therefore, they are able to do decisions together. Especially women, but also most men, seem to be unable to get into this group and affect the decisions they make. However, one of the interviewees speculated that the group of men may not be discriminating anyone after all because it may be that they have a right to do the decisions based on their job roles.

Couple of the interviewees brought up that there is variability in the quality of relationships between different persons, but it is normal since other are more socially talented in nature and some people just do not match well together. One wanted to say that there are some individuals who are constantly rude, and it is uncomfortable to work with them, but still everyone is able to work with one another. One of the women thought that actually women may have even better possibilities to create relationships at work because they are often socially more talented. One of the women felt that the only issue in social relationships for her as a woman has been that she is not able to hang out with a male colleague by asking one for a beer for example. She considered that it is a good way to build a better relationship with a co-worker but going out with a male colleague just would not be socially acceptable for her.

11. Do you feel that you and your expertise are appreciated in your organization nowadays?

Generally, all the women who answered this question thought that they and their expertise are appreciated in their organization. However, couple of the women wanted to add that sometimes they have encountered situations in which their competence has not been valued. One described that the depreciation comes from few individuals who for example shoot down their work without even taking a closer look. Another interviewee thought that those times she has faced or witnessed depreciation, the underlying reason has every time been that some persons just do not get along.

12. Have you noticed if there are different kind of attitudes and prejudice towards men and women in your organization nowadays?

Only two of the interviewees answered that in their opinion there is no different attitudes and prejudice towards men and women in their organization. Five of the seven women told that there are people with less or more problematic attitude towards women. Couple of these five women wanted to clarify that there are only few that type of people in their organization.

Two of the interviewees described the problematic attitude as general depreciation of the competence of women, and two told that some people even seem to think that women are good enough only for working as an assistant. One of the interviewees told that she has heard someone saying that women are not suitable to work as managers. Also, some issues which were mentioned before with the previous questions were brought up again: the group of men who seem not to be willing to take women along, and that women need to prove their abilities especially when they start working at the Case company. Weird assumptions of women were also mentioned by one of the interviewees. Male co-workers have for example assumed that two women cannot get along at work, and if a woman asks scissors, she is probably going to use it to cut her finger nails and not opening a package. The women in this interview had different opinions of how severe the attitude problems towards women are. One stated that the only thing that might seem like a problem is that someone may prefer working with certain people, but that is just based on the fact that these people get along well, and it is not meant to be harmful for others. Another woman however stated that there is a team in which the negative attitude towards women is so strong that she hopes that no woman will end up working in it.

Despite the negative experiences of the majority, some positive comments in this topic were also brought up. One wanted to tell that she is glad that more women had been hired, and another was happy there are also several women working as managers nowadays. Lastly, one of the interviewees wanted to highlight that nowadays the attitude problems towards women are luckily rare at the Case company.

13. Image, that there would be gender balance in the field of IT. This means that in all companies, including the Case company, there would be as much, evenly competent men and women working in all roles and levels of the company. There would be also gender balance among the students in the STEM fields in the education systems.

13.1 Would your social relationships at work be somehow different?

This question divided the opinions, but no one thought that this kind of change would affect their social relationships positively. Two commented that they simply just do not know and therefore could not answer. Also, two of the women were certain that the number of women in the organization would not affect their social relationships. Two others did not like the scenario and thought that it would affect their relationships in a negative way.

For many the higher number of women in the company was probably associated with the diversity of viewpoints and its positive outcomes for the Case Company as three of the women mentioned this, even if it is was not related to their social relationships which was the question in this case.

This question raised also various other comments:

“I would rather work with only men.”

“Social contacts at work would be richer for both men and women which is a good thing.”

“It is hard to imagine that there would really be also men working in the HR department because I think that they do not fit in that kind of roles.”

“It would be great if there were more women working in here but 50% would be too much.”

“This scenario raises contradictory thoughts in my mind as I think there could be both positive and negative outcomes.”

“The only difference that I can imagine in my social life is that I would not have to sit alone in the sauna when our team gathers to have a team night.”

13.2 Would the attitudes and appreciation of others be different in your organization?

Over half of the interviewees, four of the all seven, thought that if half of the employees would be women it would affect positively on the current attitudes and appreciation of others in their organization. Also, one thought that it would affect positively on attitudes, atmosphere and the working methods, but could not say how it would affect the appreciation of others. One of the women thought that the number of women would not affect this kind of things, and lastly the opinion of one of the women was that the consequences would be negative on attitudes and appreciation of others.

Two of the women commented the positive effects that the current biases and questioning of the abilities of women would diminish, even though there is not much of those today. Also, one thought that in this type of change women would be heard much better and therefore they could participate more in the decision making.

Those that saw this scenario as unpleasant commented that women are often back stabbing and complain about unnecessary things. One also thought that women are not as suitable as men to be leaders of multinational companies because some cultures do not appreciate women as we do in Finland.

One of the interviewees had positive thoughts about the future telling that the young generation appreciates equally everyone despite of their gender or other qualities. However, one wanted to criticise at this point the current practices saying that the company is currently trying to fix the gender diversity numbers by hiring unqualified women.

13.3 Would your possibilities to develop your career be somehow different?

This question was clearly hard to answer for many of the women as the answers of most of them were highly uncertain. Only one of the interviewees gave a clear answer that in her opinion the higher number of women in the company would not affect her career development in anyway. Two interviewees did not know if this scenario would have any effects. Two were uncertain but were speculating more negative effects, whereas also two were unsure but speculating positive effects.

Those that speculated the positive effect commented for example that if there would be more women they would be asked more in the open positions within the company, and one thought that possibly women would have the courage to apply more in the leader

roles at the higher levels since there would not be a pressure of being the only woman among men.

Those that did not think the scenario would be good for their career development commented for example that they would not like to have a woman as their own line manager, and another thought that her career development would be more challenging because there would be more back stabbing by the other women.

Other thoughts that this question raised were:

“If a person has competence the career development is caught up on only the personality and the will of the person.”

“So called women quotas or the goals in gender diversity are not necessary that bad as many women in the Case company think.”

“I have heard that in the time of considering a recruitment of a woman some people really count how much the woman would be away from work in the future because they are having children. That is just not right.”

“I think that the age discrimination is a bigger issue than the discrimination of women in the career development of employees in this company.”

13.4 Would the beginning of a career be different for women who enter the field in the Case company?

Most of the interviewees thought that the beginning of the career would be easier for women if there were already more women working in the company. Three were very positive about that and in addition two interviewees considered that it could possibly be easier. However, one of the interviewees thought that the start of the career could be harder compared to current situation. One of the interviewees did not really comment the question but stated that people are currently very welcoming for the new women and think that they are very brave to enter the IT field.

Two women thought that more girls and young women would probably seek studying the STEM fields because they would see that it is completely normal field for women too. Also other who speculated more positive effects commented that the group dynamics would be better and that is why it would be easier for a beginner to join in, young girls would not feel the pressure of being the only woman and therefore would not underrate themselves and they could be freely themselves among others, and the young women studying the field would not have to stress out how they manage to fit in among men at their future workplaces. One interviewee spoke of the actions that should be done by saying that there should be more efforts towards the universities and universities of applied sciences to get more young women in the company.

One of the interviewees did not think that the scenario would be good especially for the ones who enter the IT field, as more women would mean more social conflicts. She thought that social conflicts would probably increase because they are so common in the women dominant fields such as the health care sector.

Bullying and harassment

14. In your work community at the Case company, have you experienced any sort of bullying or harassment? (Bullying, Feeling outcast, Depreciation from a colleague or from line manager, Sexual harassment)
(If the answer is “Yes”)

14.1 What kind of bullying or harassment have you experienced?

Two of the interviewees stated that they cannot recall any experiences of bullying during their career.

Sexual harassment was experienced by two of the seven interviewees in the Case company at the beginning of their career. Both of them had confronted one of these incidents. The other of the women told that she had managed the situation by herself soon afterwards by discussing with the one who did it, but another one had not done anything at that time and now felt bad about that.

Related to the bullying within a team or between colleagues many of the interviewees had thing to comment. Even if this question was not especially about the gender-based discrimination, two wanted to state that they have confronted some inappropriate behaviour, but their gender has never been the reason, but instead it had been a cause of work pressure combined with poor abilities to handle the stress. Other who had confronted some sort of bullying in the team or between colleagues told about various situations: one told she had felt as an outsider when she was the only woman in the team which affected her socially but also her ability to get work related information, one had felt that men who were more aggressive to advance on their career had overtaken her, for one of the interviewees the discrimination was at one point so bad that she needed to change a team because nothing else helped, one told that she has heard a lot of underrating women in the jokes of others, one stated that there are few people who are constantly rude and behave inappropriately, and lastly one of the interviewees had heard foreign colleagues commenting her appearance.

Various women had things to comment also about their supervisors and managers. Probably the most severe incident faced by the interviewed women was that one needed to change the department she was working because the line manager at that time was acting so inappropriately towards her. One of the interviewees also told that she has previously had a line manager who tried to manipulate her thoughts and behaviour, but situation got better after she realised the situation and expressed that it was not acceptable. One felt that she has been discriminated because her manager has not granted a manager education for her even though she has wanted that for a long time. Other who had had negative experiences of their managers also told that instead of getting constructive feedback they are currently getting inappropriate feedback from their line manager, and also that they need to prove their capability more than men to get the same respect and achievements.

14.2 When these situations have happened during your career? Have you experienced any bullying or harassment during the last two years?

As in the previous question, two of the interviewees did not recall of experiencing any bullying during their career. One told that the last incident was about 20 years ago, another one told that the last experience of her was over 7 years ago, and two told that there has not been any bullying recently. However, one of the interviewees told incidents that had

happened during the recent years, and another one had experienced some sort of bullying her whole career.

What was commented for this question were that the dynamics of the teams have improved during the years, one has experienced that the bullying has decreased when she has learned to be careful of not arising it, and one told that the inappropriate behaviour towards her has increased when she got a role with more responsibility but that is just part of the role. Some told that the only recent occurrences have been something what foreign colleagues have commented but she reasoned that the state of equality is not as high in other cultures as in Finland. One of interviewees brought up that she knows that there are still few “chauvinistic” persons in the company, but she has not had any incidents with them.

14.3 What do you think might have been the trigger for the bullying or harassment?

This question was not discussed separately in any of the interviews as it turned out that the women spoke their thoughts about the possible reasons and triggers for the bullying already with the previous question.

14.4 How have you reacted to bullying or harassment? What kind of personal coping methods do you use in the situation or after? Have you used any help provided by the Case company?

Four of the women in the interviews told that usually they try not to care if they hear or face some minor discrimination or inappropriate behaviour. Three told that they have had a good manager whom they have managed to rely on. Two of the women told that they instantly say something back if they face some sort of bullying or discrimination. Two women told that couple of times coping with the emotions caused by bad days at work has meant crying a few tears at work in the bathroom or at home.

Despite some of the women have been able to lean on their manager, one interviewee told that telling the manager about the harassment has not help at all. Also, despite some women told that they always say something back at the bullies, one interviewee told that she rarely says anything back, especially if she estimates that it would not change anything. Another interviewee commented that when a verbal interference has not helped, she has decided not to work with the person who has acted against her. One of the women told that she once needed to change her team because nothing else helped in her case.

One of the women in the interviews thought that women, and also other people seem to get offended from the most minor issues. Then again, another one planned that she is going to pay back if someone will again behave rudely towards her.

Some interviewees commented the topic in a more neutral manner. One commented that usually in work related issues it is enough if they stay calm and justify their arguments with special care for others who are against it. Another had experienced that the training materials provided by the company have been very helpful in the learning of personal coping methods for challenging social situations at work. Lastly, one wanted to bring up the support she has had from her family at times when she has had stress at work.

15. Do you know if there has been any bullying or harassment towards other persons in your organization? (If the answer is “Yes”)

15.1 What kind of bullying or harassment you know there has been?

Three of the interviewees told that they have not witnessed or heard any bullying or harassment towards other people in the Case company. One told that she has not seen any incidents in the recent years. Two told that they have not seen anything especially towards women, but they have seen general inappropriate behaviour.

One of the interviewees commented that she has seen that few individuals act rude and inappropriately towards others. The types of incidents the women mentioned seeing lately were understating someone's competence, acting aggressively in a meeting, bad communication under pressure, persons with responsibility get inappropriate feedback, and minor verbal bullying which however did not seem so bad that anyone would have taken offence of it. From the past one of the interviewees recalled that one "chauvinistic" manager mistreated her friend, but she also stated that luckily the manager is not working at the company anymore. One of the interviewees wanted to praise her current team in which the atmosphere was open, and everyone could speak up if some challenges occurred.

15.2 Has there been any bullying or harassment within the last two years?

This question was not discussed separately with any of the interviewees as it turned out that the women spoke about the timing within the answers of the previous question.

Internal actions for better gender equality

16. Please, list 3 actions, you would like to be done at the Case company to improve the gender equality?

Most of the women were able to list three actions to be made in the Case company to improve gender equality. Two of the interviewees could not list more than two actions.

To rate the importance of these suggestions the answers were scored. The suggested action which was mentioned first by the interviewee got three points, the second action got two points and lastly the third action got one point.

The suggested action which received most points was *The Case company should hire more women and young people* which got altogether 13 points and was mentioned by most of the interviewees, altogether 5 women. Most of them mentioned that they are aware that the Case company is currently already putting efforts in this, and the recruiting of women to IT field is hard, because there are so few of them who apply. Women thought that actions could be aimed for the students of STEM fields, but also for children so that they could choose STEM fields to study later in life.

The second most points, altogether 10 points, received *Fixing the wage differences* which was mentioned by four of the interviewees. Women told that they are aware that some of the differences could be for example a cause of the absences of women when they have had children. Still they thought that some wage differences are not reasoned, and they should be fixed. The women were also interested to hear what all reasons can be behind the wage differences if they really are well reasoned.

The third most points received *There should be more women in higher positions* which got 6 points and was mentioned by four of the women. The women spoke that the action to achieve this could be to encourage women to apply in the roles and making sure that the women would feel that the positions are open for them too.

Reminding everyone about the gender equality every now and then received altogether 5 points from two interviewees. The women thought that especially some elder men with conservative attitudes, the leaders in the higher levels of the company and team managers could need a reminder of what are the guidelines of the Case company with gender equality and what do they mean in practice.

The next suggested action was *Fixing the job grade system* which got altogether four points from two of the interviewees. This issue was related to the wage differences the women pointed out as the job grade levels come with a reward. These two women thought that the job grade system does not work as it is currently. Two problems with it were mentioned: Some employees are not able to get a raise of job grade even if they would like to, and some women do not want to accept a raise because it means that there will be more responsibilities included in their current work.

Two last suggestions from the interviewees received both only one point and were mentioned both by one interviewee *Managers should be more understanding for women who return from a maternity leave*, and *Encouraging men to stay home to take care of their children when they are sick*. The maternity leave issue with managers comes from the experience of an interviewee that her manager did not give her proper tasks of work when she returned back to work. In the interview she told that it did not even help that she tried to convince the manager that she is ready to do work as usual. The second suggestion that men should stay home more often when their children are sick was suggested by an interviewee who had noticed that in the Case company women tend to be absent more often than men because of this reason. She wanted to add that she understood that it is a private issue of every family how they deal with the child care, but it does not do any harm if the men are encouraged to participate more.

5. Discussion

The discussion chapter summarizes the previously presented results of the study, but also discusses the meaning of the findings related to the prior literature. This study was conducted with employees who were working in software development organizations within a large-scale IT company. In this study the existence of gender-based discrimination was investigated by doing a survey with the employees and afterwards interviewing some of the women working in the software development organizations. Finally, this chapter also provides some practical implications for the Case company and other large-scale IT companies based on the research.

5.1 Summary of the results and answering the research questions

The results of the empirical study of this research will be presented in this chapter. Both the results of the survey and the interviews are summarized under a theme they are related to. At the same time, this chapter provides answers to some of the research questions. The answers for each sub-question a, b and c are based on the study results. Lastly, the answers of the sub-questions will be put together for the main question in chapter 5.1.5. Answering the main research question is not only summarizing the answers of sub-questions, but also analyzing if the reported formal and informal discrimination occurrences are gender-based.

What kind of gender-based discrimination is there nowadays in software development of large-scale IT companies?

- a. How men and women experience and perceive gender equality in their working environment?*
- b. How men and women experience and perceive topics related to formal discrimination?*
- c. How men and women experience and perceive topics related to informal discrimination?*

In this study the participants were asked to give their responses in various questions related to gender equality and discrimination. The respondents based their answers on their own experiences and perceptions. Some topics are not necessarily very close to some participants and therefore some of the responses are more based on the perceptions of the respondents. Then again, more personally close topics were easier to comment based on the respondents' own experiences. Both the experiences and perceptions of individuals are subjective. Everyone experiences and perceives things in their own way, which is also considered with the answer for the main research question in chapter 5.1.5.

5.1.1 Background information

The variations in the background information of the participants were investigated in this study to see if there are some baseline differences between the men and women who answer the survey. Also, it was considered important to see if the career profiles of the interviewees correspond to the profiles of the general population.

This information about the participants' career profiles is important since other gender and IT studies may have had participants with very different career backgrounds compared to this study and therefore the results might not be completely comparable. Also, if someone wants to replicate this study, I recommend that the backgrounds and current career profiles of the participants are considered.

Table 1. Results regarding the background information of the participants

	Survey results	Interview results
Participants	The 193 responses were received from both two internal organizations of the Case company, Organization-1 and Organization-2. (#1)	The 7 volunteers were from both two internal organizations of the Case company, Organization-1 and Organization-2.
Gender	Both men and women. 47 of the respondents were women and 146 men. (#2)	Only women. 7 volunteers were invited to the interview.
Job role	Most of the respondents were working in technical job roles. From the women who responded currently 70% considered being in technical, 19% in managerial, and 11% in a mixed job role. Gender differences: No significant difference between men and women. (#6)	Three technical specialists, two project managers, and two line managers.
Years in the IT industry	The mode of the response options for the question about experience years in the IT industry was "Over 20" years. (Occurred 86 times) (#3)	5 out of 7 had over 20 years of experience in the IT field. (#1)
Years in the Case company	The mode of the response options for the question about experience years in the Case company was "Over 20" years. (Occurred 64 times) (#4)	All of the 7 interviewees had been working in the Case company most of their career. 5 out of 7 had over 20 years of experience in the Case company. (#2)
Leaving the Case company	-	6 of 7 interviewees told that they had considered leaving the Case company at some point of their career. The reasons varied a lot from a bad team spirit and social relationships to the concerns of the uncertainty of the IT field. (#6)
Years in the current position	The mode of the response options for the question about experience years in the current position was "2-5" years. (Occurred 72 times) (#5)	-

	Survey results	Interview results
Gender diversity in the team	-	Four of the 7 interviewees are the only woman in their current team. There are several other women in the teams of the other three women. (#3)
Job role and education match	<p>Most respondents considered that their current role matches well or partly with their education.</p> <p>Gender differences: Slightly more men compared to women felt stronger that their education matches with their current role. (#7)</p>	-
Perception of the IT field	-	None of the interviewees told that their perception of the IT field had changed drastically during their career. Instead, most interviewees highlighted that they have achieved deeper levels of understanding of the field. (#4)
Satisfied with the role	<p>Majority was satisfied with their current role.</p> <p>Gender differences: Slightly larger share of women was satisfied with their current role compared to men. (#8)</p>	5 of 7 women brought up that they are satisfied with their current job, despite it was not asked. One of the women expressed her interest towards other types of work tasks, but still did not say that she is unhappy with the current tasks. (#5)
Inspired with the role	<p>About a quarter of respondents were not inspired with their current role.</p> <p>Gender differences: No difference between men and women. (#9)</p>	-
Career orientation	<p>Over 90% of the respondents were interested to develop their technical skills, and under 40% were keen on advancing on managerial career path. These answers were fairly similar between men and women</p> <p>Gender differences: Slightly more women either agreed or disagreed about the interest to change to a new competence area, whereas more men compared to women had neutral thoughts about the topic. (#10)</p> <p>Almost all respondents felt that their current career orientation matches well or partly into their current role in the organization.</p> <p>Gender differences: No significant difference between men and women. (#11)</p>	The career stories of the seven interviewees were various, except that all seven interviewees had started their career in the Case company in technical job roles. Four of them had later changed to managerial roles based on their own interests or the suggestion of others. Some interviewees were still very keen on the technical tasks. Couple told that they are not very career oriented. Also, couple told that they have learned their strengths and preferences during their careers. (#5)

	Survey results	Interview results
Job rotation	<p>Most of the respondents had not been reassigned within the Case company in the job rotation during the last years.</p> <p>Gender differences: Compared to men more women had been reassigned. (#12)</p>	-
Regularly organized resource balancing review	<p>Most of the respondents had not been reassigned within the Case company with the regularly organized resource balancing reviews during the last years. (#13) For those men and women who had been reassigned with the regularly organized resource balancing reviews the job role changed in about half of the cases. (#14)</p> <p>Gender differences: Compared to men more women had been reassigned. (#13)</p>	-

There were both men and women involved in the study from the two internal organizations of the Case company. In the survey the group of participants was bigger, and answers were received from almost 200 employees, in which about every fourth was a woman. In the interviews there were 7 participants, all women.

Both research methods included several background related questions. The main purpose of the research is not to investigate the differences or similarities between men and women, but in order to investigate the possible gender-based discrimination for example by comparing the experiences and perceptions of men and women, it is good to take a brief look if there are some outstanding differences in the career profiles of the men and women. Since the previous knowledge suggests that the gender equality challenges in this field and in this company are especially issues of women, we are therefore taking a look also at the background information of the women to form some kind of a picture how homogeneous or heterogeneous this group of employees are.

The similarities between men and women were visible in many answers regarding the background of the employees. In the survey the respondents chose from three different options if they considered their current work as technical, managerial, or mix of both of these in nature. There were no significant differences between the responses of men and women, about 70% of both men and women considered that their work is technical. The career orientations of the majority were also very technical as most of the respondents told that they would like to develop their technical skills further. Advancing on managerial career path was not as popular among the respondents as about 40% of both men and women chose that as one of the components of their career orientation. Also, almost all considered that their current role matches well their career orientations. Women and men were also equally inspired of their current job. Even though the experience years in the industry and in the Case company were analysed in very high level to protect the anonymity of the respondents, still the most frequent responses in both survey and interviews followed the same line. Most of the respondents had been working over 20 years in the IT industry and in the Case company.

The results of the study revealed also some moderate differences between the background information of men and women. A little larger share of men, though also most of the women, felt strongly that their current job role matches well their education. Also, a larger share of men had neutral thoughts about changing their competence area, whereas more women compared to men were either against or willing to change their competence area. Even though majority of the respondents of the survey were satisfied with their job role, even more women were satisfied compared to men. The job role of an employee can be changed in the Case company also without the person especially applying for a new role, for example with job rotation or regularly organized resource balancing review (the Case company has a specific name for the procedure). Compared to men women had been moved more with these procedures.

The results of the study suggested also that women are far from a homogeneous group. In the same way as men, there are women working in different types of software development job roles in the Case company. In the interviews there were at least two women who were working as technical specialists, project managers, and line managers. Four of the women were the only woman in their current team, whereas there were several other women in the teams of other interviewees. The stories behind their careers were various: Even though all of them had started their careers in technical roles, the current situations and goals in the future were rather different for each interviewee. The preferences and goals in the career of many had changed with the changes of life situations and gaining more experience in the IT field. Some of the respondents felt that they have never been very career oriented, but still their career had developed well. Then again, other considered that their career development had happened because of their own actions. Some interviewees seemed to be the type who thinks very carefully even before applying for a new job, whereas others had accepted new roles in their past even though they even had not recognized their own suitability for the task at the time.

Most of the women in the interviewees had considered leaving the Case company at some point of their career. The reasons to leave however varied a lot for the six women who told so: bad atmosphere and relationships issues, lack of variability in the work tasks, the uncertainty of the IT field, the stress and pressure at work, too low wage, the stiffness and politics of a big company, and the peer pressure when everyone else have seen to be applying elsewhere. However, it is notable that most of the interviewees had a long, over 20 years of history working in the Case company while a lot had most definitely happened.

5.1.2 The gender equality

In this study the gender equality means valuing both men and women equally. According to Finnish gender equality law, gender equality at workplaces is largely about preventing gender-based discrimination. The individuals may however have other perceptions of gender. Therefore, in addition of investigating the perceptions and experiences of the state of gender equality, it is also important to investigate what the participants think the gender equality or the lack of it is.

Table 2. Results about the experiences and perceptions of the gender equality

	Survey results	Interview results
Gender equality in the Case company	Gender differences: 85% of men think that men and women are equal in the Case company, whereas only 32% of women think so. Instead 57% of women think that there are slight issues in the gender equality. (#29)	-
Gender equality in the local organization	The respondents think that the state of gender equality is better in their own organization than in the Case company in general. Gender differences: 93% of men think that men and women are equal in their own organization, whereas only 51% of women think so. Still 43% of women think that there are slight issues in the gender equality at their organization. (#29)	Four of seven interviewees expressed that in their opinion there are currently some gender equality issues in their organization. The rest three answered at first that the state of equality is good, but in the end all the interviewees listed at least one issue related to gender equality. The issues varied a lot from wage differences, and unpleasant behaviour towards women to the need of women to prove their capability. (#9)
Preferred actions for better gender equality	-	The interviewees were asked to list actions to improve gender equality in the Case company and most of them were able to list three actions. The most popular were <i>hiring more women and young people, fixing the wage differences, and getting more women in higher positions</i> . (#16)

Here the first sub-question will be answered based on the empirical results presented in the Table 2.

a. How men and women experience and perceive gender equality in their working environment?

The differences between men and women are notable in the responses regarding their estimation of the state of gender equality in the Case company and their own organization. A clear majority of men estimated that men and women are equal both in the Case company (85%), and in their local organization (93%). The rest of the men however estimated that there are minor issues in the gender equality.

Compared to men, a significantly larger share of women see issues in the gender equality. On the level of the whole Case company over half of the women respondents (57%) estimated that there are minor issues, and every tenth (11%) that the existing issues are big. Also, on the level of the local organizations' women consider there are problems, however compared to the company level the situation seems to be slightly better. Less than half of the women (43%) estimated that there are minor issues in the gender equality, and 6% of women considered the issues in their organization are big.

In the interviews, half of the women stated that there are minor issues in the gender equality in their organization, whereas the other half stated that the state of gender equality is good. However, despite the generally positive statements of some, every interviewee listed at least one gender equality issue. The mentioned issues were various, other quite notable and some which did not seem to be so significant for the interviewees. The issues suggested both formal and informal discrimination, which were investigated deeper with other questions presented in the next two chapters.

The interviewees were also asked to list actions they would hope the Case company would take to improve gender equality. Clearly the most popular wish *hiring more women and young people to work in the Case company* was surprising since it was not clearly connected to the gender equality issues which were mentioned earlier.

The second most popular hope for action from the Case company was *investigating the reasons behind wage differences and fixing the wage differences*. The lower wage of women was a topic which was brought up many times in both the survey and the interviews. Some seemed to know that there really are undeniable wage differences, and even if the fixing of the wage differences were known to be challenging, they thought that it should be done as soon as possible. Then again some had heard rumors about the wage differences but were not sure and therefore did not want to list it as one of the gender equality problems. Nevertheless, also those who were unsure hoped that the investigation of possible wage differences and the reasons behind them would be somehow done.

The hope to get *more women in higher positions in the Case company* was the third most popular of the actions and was brought up in both the survey and the interviews. Many did not mention how they would hope this to happen, but some suggested that women should be encouraged more because it is more challenging to stand up from a minority group and all women do not recognize their own capabilities. It was seen that with the right encouragement more women would apply to upper level positions. Also, some responses suggested that women are not asked to take positions with more responsibility as often as men are. One of the interviewees though that when a woman is asked to take a role, it is not doing any good if the woman refuses because she just does not want to be considered as one of the quota women.

5.1.3 The topics related to formal discrimination

The prior literature describes formal discrimination as the biased usage of organizational resources such as pay, promotions and job responsibilities. Therefore, this chapter focuses on experiences and perceptions about the pay, career advancement, promotions, recruitment, and the support received from the manager.

Table 3. Results about the topics related to formal discrimination

	Survey results	Interview results
Applying new job within the company	Gender differences: During the last years women had been more active in applying for new jobs inside the Case company compared to men. A larger share of men had not applied a new job within the Case company at all during their career. (#15)	-
Applying for upper level jobs	About half of the ones who applied for a new job within the Case company were seeking for an upper level role. Gender differences: No significant difference between men and women. (#16)	One of the interviewees speculated that if there were equal number of men and women working in the IT field, it might be that women would have more courage to apply management positions. (#13.3)
Not applying new jobs within the Case company	The ones who had not been active in applying for a new job during last years reported mostly three reasons: being happy with the current role, being busy with other things in life and lack of interesting job opportunities. Individual open responses included ones such as being asked in a new role and starting the work in the Case company only recently. Gender differences: Most men reported that they had been happy with their current role, whereas for women it was as popular response as being busy with other things in life. (#16)	Some interviewees told that they originally ended up changing their previous job role when they were asked to take a new kind of role. Couple of the interviewees considered that they are not very career oriented, and therefore they do not actively seek for new possibilities to advance. One even told that those who are willing to take more responsibility in the Case company can end up easily carrying too much responsibility. (#5)
Interviewed for a new job in the Case company	Gender differences: During last year 17% of men had been interviewed to a new job position inside the Case company (#17), even though only 10% reported that they had applied for a new job (#15). The share of women who had been interviewed was 15% (#17) which was exactly the same as the share of women who had applied for a job (#15%).	Couple of the interviewees mentioned that they have a feeling that men are asked much often to management positions and to roles which require some sort of technical expertise. Couple also told that it is common to ask men for technical advice and never any of the women, even if the topic was an expertise area of some of the women. (#9) One of the interviewees speculated that if there were equal number of men and women working in the IT field, it might be that more women would also be asked to open positions. (#13.3)
Being selected after being interviewed	Most who were interviewed for a new position (#17) were also selected for the position. Gender differences: Slightly more men compared to women were selected after the interviews. (#18)	-

	Survey results	Interview results
Opportunities in the Case company	<p>Most of the respondents thought that the Case company can provide opportunities for them to fulfil their personal career aspirations. (#19) The few who did not feel that there are suitable opportunities for them reported reasons such as interesting positions are not open for everyone, and personnel in the job roles are not changing. (#20)</p> <p>Gender differences: No significant difference between men and women.</p>	<p>Many of the interviewees told about the ways that the Case company had managed to find a satisfying solution to a difficult situation, when they themselves thought that the best solution could be leaving the company. The company seemed to have a lot of possibilities to offer for its employees. (#6)</p> <p>One interviewee thought that the career advancement is caught up on only the personality and the will of the person if the person has the required competence. (#13.3)</p>
Plans to level up	<p>About half of the respondents had plans to level up at the Case company at some point.</p> <p>Gender differences: Although slightly more men had plans to level up in the near future, there was more women who had plans to level up in a long run. Overall just slightly more women were planning to level up compared to men. (#21)</p>	-
Fairness in fulfilling open leader positions	<p>Most of the respondents reported that they feel that the communication of open leader positions is not always reaching all necessary employees. (#22) However, the question about fulfilling of open leader positions did not raise as negative reactions. (#23)</p> <p>Gender differences: More men compared to women thought that open leader positions are fulfilled with a fair procedure, whereas more women answered, “not always”.</p>	-
Preferred support for career planning	<p>In average the four most wanted support methods for career planning were mentoring, support from line manager, sharing the experiences and trainings.</p> <p>Gender differences: There were some moderate gender differences in the preferences. More men prefer trainings and push from the line manager, whereas more women prefer support from the work community and social networking. (#24)</p>	-

	Survey results	Interview results
Career planning with the line manager	<p>Most respondents had been discussing about their career plans with their line manager. (#25) The few who had not had the discussions reported that they do not need their manager for the career planning, the line manager has not been interested to discuss about the topic, or the respondent had been happy in the present job role. (#26)</p> <p>Gender differences: Slightly more women had discussed with their line manager about the career plans. (#25)</p>	<p>Few of the interviewees had some very negative experiences of their managers such as manipulation and inappropriate behaviour, but also discrimination in getting more training and constructive feedback from the manager (#14.1).</p> <p>However, some have had managers whom they have managed to lean on both in career planning (#5) and in challenging social situations (#14.4).</p>
Support from line manager	<p>Majority agreed at some level that they get support from their line manager.</p> <p>Gender differences: There were significantly more men who agreed strongly, and in comparison the same share of women answered “neutral” at this statement. (#30)</p>	
Gender and salary	<p>Gender differences: Majority of men did not experience that their gender would have affected their salary, but every fifth of the men were unsure about the impact. In contrast almost half of the women responded that their gender has been a disadvantage regarding their salary and in addition 40% are unsure about the impact. (#31)</p>	<p>Investigating the reasons and fixing the wage differences between men and women was the second most wanted action for improving gender equality in the Case company. (#16)</p> <p>Couple of the interviewees considered that their wage had been too low earlier in their career, but the situation has improved. (#9)</p> <p>One of the interviewees had even considered leaving the company at the beginning of her career because of the low salary. (#6)</p>
Gender and career advancement	<p>Gender differences: Majority of men did not experience that their gender would have affected their career advancement, but every tenth of the men were unsure about the impact. In contrast about every third of the women responded that their gender has been a disadvantage regarding their career advancement and in addition 20% were unsure about the impact. (#31)</p>	<p>Imagining if the possibilities to develop one's career would be different if there were as many men and women working in the IT field was a difficult question for the interviewees. Majority could not give a clear answer and they could not say if the possible effects could be positive or negative. (#13.3)</p>
Gender and training	<p>Clear majority had not experienced any impact of their gender on the possibilities to get more training and education.</p> <p>Gender differences: No significant difference between men and women. (#31)</p>	<p>One of the interviewees considered that she has been discriminated by her manager because for years she has hoped to get additional training which could help her possibly in career advancement. (#14.1)</p>

	Survey results	Interview results
Management style	<p>Gender differences: Clearly more men compared to women agreed that the management style in their organization is fair, whereas more women disagreed or chose the neutral answer. (#30)</p>	<p>Management style was not included in the interview questions, but some positive and negative things related to it were mentioned.</p> <p>The lack of constructive feedback and women's need to prove their capabilities were among the negative ones. (#14.1) Also, it was hoped by two interviewees that managers, leaders and some elder men with conservative attitudes should be reminded about the gender equality at work (#16). However, line managers got also positive feedback about their support in career planning (#5) and social situations (#14.4).</p>
Influencing the job related decisions	<p>Majority agreed that they are able to influence the decisions regarding their job.</p> <p>Gender differences: Again there was more men who agreed strongly, whereas slightly more women disagreed or choose the neutral answer. (#30)</p>	-
Gender and assessment of performance	<p>Gender differences: Majority of men did not experience that their gender would have affected the assessment of their individual performance. Also, majority of women thought so, but still many were unsure and few had experienced their gender as a disadvantage. (#31)</p>	<p>Multiple interviewees felt that women are not taken seriously at work and men are usually the ones who are asked for advice (#9, #12). Couple thought that women need to prove their capabilities more compared to men to get the same respect and salary (#9). 4 of the 7 interviewees could imagine that women would be appreciated at work more if there were as many women and men working in the IT field. (#13.2)</p> <p>However also many women thought that they and their expertise are currently already appreciated at work. (#11)</p>
Expertise and work task match	<p>Gender differences: The shares of men and women who agreed that their expertise matches well with the tasks they get was rather even. However, there were few men who disagreed about this statement. (#30)</p>	-

Here the second sub-question will be answered based on the empirical results presented in the Table 3.

b. How men and women experience and perceive topics related to formal discrimination?

Few questions related to formal discrimination received very similar responses from both men and women. Equal shares of men and women who had been active in applying new

job roles within the Case company, had applied especially for higher level roles. Also, equally majority of men and women thought that the Case company has possibilities to fulfill their career goals. In addition, getting more training and the continuity of employment were topics, of which both men and women thought that their gender had not had any impact on.

Many topics related to formal discrimination raised different responses between men and women. The results of the survey presented some very notable differences, where the shares of men and women differed with several tens of percentage points. In other cases the differences were only few percentages, but still the differences were significant because of the nature of the topics.

The most notable differences were in responses related to salary and career advancement. Almost half of the women felt that their gender had affected negatively their salary, and additionally 40% were unsure if it had affected or not. Majority of men did not believe that their gender would have affected to their salary, but still even every fifth of the men were unsure of the impacts. Only one of the men who responded being unsure of the impact of his gender to his salary gave more information of this answer in his open feedback. He told that he was fairly sure about that being a man had been an advantage, but he felt that he could not give that as an answer for this question. Similar types of results were also received regarding the career advancement, even though not quite as severe as regarding the salary. Still, even every third of the women felt that their gender had been a disadvantage in the career advancement and every fifth of the women were unsure if it had had an effect.

Fairly notable difference was between the shares of men and women who had recently been actively seeking for a new job within the Case company. Women had been clearly more active within the last five years compared to men. During the last year 15% of women and 10% of men had applied for a new job. Apparently, every one of the women who had applied had also got an interview for the role, as 15% of women had been in an interview. However, from men as much as 17% had been interviewed for a new role within the last year, which suggests that sometimes men get the invitations even though they do not apply for the job themselves. This explanation received support from the couple of the interviews in which the women stated that men are asked more often to take new responsibilities and the competence of men is trusted more than women. However, some women in the interviews also told that they have ended up in their current role, because they were asked to take the role. So, the recruiting seems to be happening sometimes also even without interviews. Nevertheless, the interviews seemed to be successful in most of the cases, as usually the interviewee was chosen for the role, men even a little bit more often than women. The big success rate tells that it is rare to interview more than one candidate for the role. This may seem peculiar, but when the candidates are employees of the firm, their competence is already well known by the persons who make the decision.

Moderate differences were also in the reasons of not applying for a new job within the company. A majority of men responded that they have been happy with their current role, whereas for women being busy with other things in life was as frequently chosen option as being happy with the current role.

About half of the respondents of the survey were planning to level up on higher positions in the Case company. More men were planning to level up in the near future compared to women. In comparison more women were planning to level up in a long run. Overall,

there was slightly bigger share of women with these types of plans compared to men, but it might be that women need to think these things more carefully.

Communication about open leadership positions was a topic which seemed to raise mixed feelings both among men and women. Most of the respondents in the survey responded that the openings of new positions are not communicated always good enough so that everyone who is supposed to get the information would receive it. A larger share of men however thought that the leadership positions are fulfilled with a fair procedure, whereas a larger share of women thought that the procedure is not always fair.

Influencing the job-related decisions and assessment of performance received overall generally positive results in the survey. However, still the responses of women were slightly more negative compared to men. This suggest that women as a group have more mixed experiences and perceptions of these topics, and the results of the interview supported that. Many interviewees gave both negative and positive comments of these topics.

There were also some moderate differences between men and women in the preferred career support methods. The three most wanted methods received good amount of support from both men and women: mentoring, support from line manager, and sharing the experiences. Methods which received more support from men compared to women were such as trainings and push from the line manager. Instead women hoped support from work community and social networking.

The second most wanted career support method, support from line manager, is a common part of line managers work. In the survey a slightly larger share of women compared to men had discussed with their current line manager about their career plans. Despite a significantly larger share of men compared to women felt strongly that they are receiving support from their line manager. The results suggest that the perceptions of men and women might be partly different about what kind of support is expected from the line managers. It might have been that many men considered that the level of support was enough at the time of the survey and the quality of the support was good, whereas many women felt that there was not enough support or the quality of the support from line managers was not good. Also, the general management style might be the problem. Significantly larger share of men compared to women thought that the management style in their organization is fair, whereas there were more women who either disagreed or had neutral thoughts about the topic. More information about this topic was received in the interviews in which women brought up their thoughts about management style even if it was not especially asked in the questions. Many statements which were brought up were more related to general bad management rather than gender-based discrimination: line manager had not been interested about issues of the employees, the manager was prioritizing other things than the career support of the employees, manager does not understand that a woman returning from parental leave is capable to work if she feels so, and manager had been manipulating the employee. In addition, one of the negative statements was that women need to prove their capabilities more than men, but this was a general statement and not only about managers. It was also hoped that some type of reminder about gender equality would be provided for the line managers, leaders and some elder men with conservative attitudes. Even so, there were also many positive comments about line managers in the interviews and the support from line managers was hoped a lot in the future too.

The individual differences between women were fairly small in the results of the interviews. Some of the interviewees had very negative experiences of their line

managers, whereas others had received very good support from most of their managers throughout their career. Even though the support from line managers was one of the most wanted career support methods in the survey, there were also numerous other more and less supported methods. In addition, there were also some who did not want to have any type of career planning support from the Case company. Advancing on the career was a topic which the interviewees spoke about in a modest and humble manner. Many brought up that they are not very career oriented, but instead they are interested to learn more. None of the interviewees spoke about their goals to level up and reach higher positions.

Lastly, also men gave some exceptionally negative responses for couple of the survey questions, despite the results were overall positive. Another one of these findings was related to formal discrimination: even though a clear majority of all men and women agreed that their education matches well the tasks they get, few men felt that in their case they did not match.

5.1.4 Topics related to informal discrimination

Informal workplace discrimination is defined in the prior literature the type of discrimination which occurs within the interpersonal communication between employees. It is about the informal relationships and the quality of the relationships at the workplace. This chapter is therefore about the experiences and perceptions about the social aspects of being part of the work community.

Table 4. Results about the topics related to informal discrimination

	Survey results	Interview results
Bullying	Gender differences: The share of women who had experienced bullying in the Case company was high, 40%. The share of men in the survey was 10%. (#27) Those women who had experiences bullying reported most often their gender as the assumed trigger for the bullying. It was not reported at all by men. Other three most popular reasons were opinions, character and job role. (#28)	The experiences of the seven women were various. Two had not experienced any kind of bullying. Two had experienced sexual harassment at the beginning of their career. Many had had various experiences of bullying within a team or by other colleagues, or by a manager. Bullying was in many cases, but not always, related to their gender. Most of the interviewees however told that the most drastic incidents happened to them or others have not happened during the recent years. Ways of reacting to bullying occurrences and harassment were various among the interviewees. (#14)
Team spirit	Majority of both men and women agreed at some level that the team spirit is good in their work community, but still rather many did not. Gender differences: Many men agreed strongly whereas more women agreed with moderation. (#30)	Team spirit as a topic was not included in the interview questions, but it was brought up couple of times by the interviewees. Two interviewees told that they have considered leaving the company because of bad team spirit at some point of their career. (#6) One interviewee praised her current team for having very open atmosphere. (#15)

	Survey results	Interview results
Getting help from colleagues	<p>Almost all reported that they are able to get help from their colleagues.</p> <p>Gender differences: Slightly more men agreed strongly compared to women, and few women even disagreed. (#30)</p>	-
Beginning of the career for women	-	<p>Most of the interviewees thought that the beginning of the career would be easier for women if there were more women already working in the IT field. Only one thought that this scenario would have only negative effects to the beginning of women's careers. (#13.4)</p>
Feeling appreciated	<p>Majority of the respondents felt that they are appreciated in their work community.</p> <p>Gender differences: There was slightly more men who agreed with this statement, whereas few women disagreed. (#30)</p>	<p>All interviewees felt that they and their expertise are generally appreciated in their organization, excluding some rare cases and individuals. (#11)</p>
Attitudes towards women	-	<p>5 of the 7 interviewees told that there are some people with a problematic attitude towards women in the Case company. Largely the attitude problems of some are general depreciation of the competence of women. What seemed to be more common but not as severe was people's weird assumptions of women in general. (#12)</p> <p>5 of the 7 interviewees could imagine that having equal number of both men and women working in the IT field would change the current attitudes to a positive direction. Only one thought that the attitudes and appreciation of others would be worse than now if there were more women. (#13.2)</p>
Being judged for using flexibility	<p>Mostly the respondents agreed at some level that they will not be judged if they need flexibility from work, for example because of family reasons.</p> <p>Gender differences: Almost half of the men agreed strongly whereas half of the women agreed moderately. Despite the positive answers of the majority, there were few men who felt that they are not able to get the flexibility without being judged. (#30)</p>	<p>This topic was not included in the interview questions, but one interviewee hoped that men would use the possibility of flexibility more when their child is sick and one of the parents needs to stay at home to take care of the child. (#16)</p>

	Survey results	Interview results
Gender and access to information	Clear majority had not experienced any impact of their gender on the possibilities to get access to the necessary information for their work. (#31)	This topic was not included in the interview questions, but it was brought up by couple of the interviewees. One thought that women are able to communicate with other more efficiently since they are not afraid to ask if they do not know something. Many women however mentioned that there is a tight group of men who do not let anyone other to take part of the decision making. (#10)
Gender and informal relationships	Gender differences: Majority of men did not experience that their gender would have affected to their ability to build informal relationships. Majority of women thought similarly, but still many were unsure and also many had experienced their gender as a disadvantage. (#31)	<p>All the interviewed women thought that generally men and women have equal possibilities to build informal relationships and that there are no gender differences in the quality of the relationships. Instead they brought up the differences of individuals in the social skills. (#10)</p> <p>Any of the interviewed women could not imagine that their social relationships would be better if there was equal number of both men and women working in the IT field. (#13.1)</p> <p>However, three interviewees brought up that some men seem to have a group, but it was uncertain if this group was formal or informal, and could they possibly use this group to exclude other people from the decision making. (#10)</p>

Here the third sub-question will be answered based on the empirical results presented in the Table 4.

c. How men and women experience and perceive topics related to informal discrimination?

Compared to topics related to formal discrimination, most topics related to informal discrimination did not result in as notable differences between the answers of men and women. Many of the differences found were modest. Interviewing women in the second part of the study provided more information about these topics to understand what reasons there possibly are behind the differences in experiences and perceptions which were found.

Probably the most notable finding from the whole survey was that related to bullying. As much as 40% of women reported that they have experienced some sort of bullying or harassment at work in some point of their career in the Case company, and in addition majority of these women told that their gender had been the assumed reason for the behavior. In contrast, 10% of men reported that they had experienced bullying or harassment in the Case company, but none of them considered that their gender had been the reason for it.

Because of the significant difference between the results of men and women bullying was one of the central themes in the interviews, which provided a lot of information about the experiences of women. Majority of the interviewees told that during the several recent years they have not experienced nor seen bullying or harassment towards others, but there were also exceptions. The personal experiences of the interviewees were various: couple of them had experienced physical sexual harassment in the beginning of their career, and many told about bullying which was done by team mates, colleagues or the line manager. Also, the ways to react to bullying were various depending on the situation and the nature of the person itself. Couple of the interviewees were bothered that they did not do anything for the bullying or harassment they experienced before.

In the interviews majority of the women told that there are still few people in the Case company who have problematic attitudes towards women. Mostly that kind of attitude was recognized in behaviors such as depreciating the competence of women which was considered as a sign of a severe attitude problem, but also making jokes about women in general, and making weird stereotyping assumptions of women. Most interviewed women also speculated that entering the IT career in the Case company would be easier for women if there would be already as many women and men working in the field.

Overall results of many questions on the survey which related to the informal discrimination were generally positive. However, still the responses of women were slightly more negative compared to men. These kinds of results were received regarding team spirit, getting help from colleagues, feeling appreciated, and informal relationships. This suggests that women as a group have more mixed experiences and perceptions of these topics, and the results of the interview supported that. Many interviewees gave both negative and positive comments of these topics.

Another one of the exceptional negative findings from the responses of men was related to informal discrimination. Despite the results from both men and women were overall positive, couple of men felt that they will be judged if they need flexibility from work, for example because of family reasons.

One of the most positive findings related to informal discrimination was that almost all felt that their gender has not affected their ability to access information they need at their work. Actually, couple of women considered that women seem to communicate with others more efficiently compared to men. However, many interviewees also mentioned that there are some men with whom the communication of work-related issues is not possible, because these men have a group which excludes everyone else.

5.1.5 The main research question

In this chapter the main research question will be answered based of the answers on the sub-questions a, b and c.

What kind of gender-based discrimination is there nowadays in software development of large-scale IT companies?

The results of this study showed a significant difference in how men and women experienced the current state of gender equality in their working environment. The fact that most men perceived the state of gender equality good and women less good, suggested that either 1) for some reason men and women perceive differently what gender equality is in practice, and what is acceptable and what is not, or 2) men have not

experienced gender equality problems themselves and do not know much of the experiences of others either, whereas the women have. The first one did not get much support from this study. There were few findings which suggested that especially perceptions of informal discrimination varied between individuals, but not especially between men and women, such as what is acceptable behavior towards other people. However, the major and minor findings of gender-based discrimination summarized in this chapter suggest strongly that the second one is correct.

Wage and career advancement

The results of this study suggest that one the most notable signs of existing formal discrimination of women is the lower wage of women. Almost half of the women felt that their gender had been a disadvantage what comes to their wage. Investigating the reasons and fixing the wage differences was also the second most wanted action listed by the interviewees in this study to improve gender equality in the Case company.

Differences of just few percentage points in the rates of women and men who had applied for a new job, and who had been interviewed for a new job within the Case company suggested more men get invitations to the interviews even if they have not applied for the job themselves. Moreover, few more percentages of men compared to women reported that they were selected after the interviews. The reason for this might of course be that more often men have just had the competence and suitability for the task. However, every third of the women who answered the survey thought that their gender had been a disadvantage for their career advancement. In addition, there was also a relatively big difference in how fair the women and men felt that the fulfilling of open leader positions had been, in this case the women did not consider the recruitment process as fair as men. These findings strongly suggest that there is gender-based discrimination which is hindering the career advancement of women. Consequences of even a small difference in the numbers of men and women who are interviewed and selected can be severe if the difference is constant and goes on year after year. The effects of this kind of discrimination can be visible in the low number of women in the upper levels of the company. In fact, getting more women in the higher positions was the third most wanted action listed by the interviewees to improve the gender equality in their company. This study does not give more detailed answers of what are the situations in which women have felt been discriminated and do the results gathered in the survey match the real numbers of the Case company.

The wage and career advancement issues represent the formal type of discrimination which is considered more easily recognizable and is more often tried to be fixed with different actions in companies. It even might have been that these types of issues were brought up so many times by the participants, because the problems are already recognized in the Case company and actions to fix the issues are already being done. Indeed, it is hard to say if these types of discrimination are some of the most notable because of their formal nature or do they simply occur a lot. Either way, it is clear that especially women have experiences and perceptions that there are issues in the wages and career advancement of women. This strongly suggests that there is gender-based discrimination related to these topics.

Social environment

The most notable signs of informal discrimination were related to attitude problems of some individuals in the company. Problematic attitudes towards women seem to be still existing, even though the results regarding bullying suggested that they are much more unusual now than previously. Many women had recognized these types of attitudes behind toxic behavior of some individuals, mostly men. The more severe cases were told to be constant depreciation of the competence of women. This was supported by the finding that many women experienced that women are not taken seriously, and women need to prove their capability to other who they work with. Also making jokes about women in general and making weird stereotyped assumptions of women were told to be rather frequent and considered therefore hard to take at times even though they may not seem so severe.

Majority of the interviewees stated that there has not been any bullying during last years, but still, many of these same women told about a bullying or a harassment incident which had happened to them during the last years. However, all of these incidents were not especially gender-based. It is hard to say how much bullying there really is nowadays, as it seems that exceptions are not always counted. It might even be that many women and men do not want to complain about “little issues”. They may also think that the situation would get only worse if the company starts actions which are too drastic.

A minor finding was also made about the ability of women to build informal relationships in this environment. According to the survey relatively many women experienced that their gender had affected the building of their informal relationships negatively, even though majority of women felt that gender had nothing to do with it. However, majority of the interviewed women seemed to be very happy with the state of their informal relationships at work. Only couple of issues related to informal relationships were mentioned. One of the interviewees had felt being an outsider previously when she was the only woman in her team, and another felt that she, as a woman, cannot hang out with a male colleague outside work time, as the men can hang out together.

Several other elements related to the social environment of the workplace raised somewhat different thoughts in men and women. Although the answers were generally positive for both men and women, women seemed to experience team spirit, getting help from colleagues, feeling appreciated, influencing the job-related decisions a little less positively than men. However, the study did not provide much information which could explain these differences, and therefore it is hard to say is there any gender-based discrimination related to these findings or do women and men just experience these topics a little differently.

Management

Also, management style was a topic in which relatively large share on men and women did not quite agree. Even though majority of women considered the management style fair, many did not, and several comments in the interviews about both good and bad management experiences supported the distributed statistics. Many of the negative comments however were about general bad management and not something which would have been especially gender-based. Large amount of men was not happy either with the management style, which suggest that the current state of management style could use some general improvements.

Few minor findings are also suggesting that career advancement might be a topic which is perceived differently by men and women. The reasons for these findings are not probably any type of gender-based discrimination at work, but still the employer can consider if they can do something to support all of their employees in their careers. Numerous women and even a little bit more men had not recently applied for new jobs within the Case company according to the survey. Being busy with other things in life played a bigger role for women (50%) than for men (19%). I assume that “other things in life” in most cases means having children and taking care of small children at home. It raises questions if it is acceptable that family reasons are in a way of career advancement of women and should something be done to change this. Also, some other findings suggested that men and women think differently about career advancement. A slightly bigger share of women compared to men were planning to level up in the Case company. However, for many women these were long term plans and therefore probably more uncertain, whereas many men were planning to level up in the near future. Women and men also preferred partially different types on career planning support methods. Many of the most wanted methods were the same, but some men hoped to get trainings to build their competence, whereas some women wished for support to build networks.

Challenges of men?

A clear majority of the findings of this study were signs of gender-based discrimination or challenges in which women had been the victims. However small signs of the challenges men might be experiencing were also found. According to the survey few men thought that they do not always get tasks that match their own expertise, and also few men felt that they are being judged if they need flexibility from work for family reasons. Statistically the findings may seem small, but still they raise questions if there are issues with these topics. However, in this study they were not further investigated.

5.2 Research implications

Gender diversity issues are not just about the underrepresentation of the other gender group. Herring (2009) has defined that gender diversity in organizational context refers to policies and practices to include people who are considered different from the majority, which usually means the aim of creating an inclusive culture in which all kinds of talents are involved and valued. In this study however there is a more distinct difference between the terms gender diversity and gender equality. Gender diversity is referred to when the topic is about the number of women and men, and gender equality has been a term which is referred to when the topic is about valuing the members of different gender groups. However, the two different terms seem to be quite closely connected to each other. One interesting finding of the interviews was that when the interviewees were asked to list actions, they would hope the Case company would do to improve gender equality, the most wanted action was to hire more women in the company. However, none of the interviewees listed the low number of women as a problem when it was asked what issues they think there are in the equality between men and women. The possible reasons behind this surprising answer can be various, such as:

- 1) The general low number of women working in the company is considered a greater problem than the existing equality issues.
- 2) It was hard for the interviewees to suggest all of a sudden suitable solution for the gender equality problems, and therefore many mentioned something which felt more easier to do.

- 3) The interviewees thought that the number of women in the workplace is one part of the gender equality.
- 4) People think that the existing gender equality problems would diminish if there would be more diversity, and different groups would be represented better in all levels of the company.
- 5) Elder men would not be so big majority and the culture in the workplace would be therefore somehow different.

Even though it was not investigated in the study why the women answered like they did, I suggest that partly all these possible reasons are true, but the most relevant are the two first ones. Gender diversity of the IT field is clearly more in the limelight than the gender equality issues.

Comparison to general Finnish statistics

The general Finnish gender equality statistics are not completely comparable with the results of this study, but there are some clear similarities between them. The share of women working in the IT field seemed to be rather same as according to the Finnish statistics there are 27% women of all the labor (Suomen virallinen tilasto, 2018d) and in the Case company 25% (Internal documents of the Case company, 2017). In both of them the gender equality was perceived far more positively by men. The general statistics of Finland said that in male-dominant fields the gender equality was perceived as good or very good by 66% women and 81% of men (Ministry of Social Affairs and Health, 2017). The results of this study did not reach even on that level as only 32% of women and 85% of men considered that men and women are equal at their company.

The general statistics of Finland present that half of the women and a quarter of the men have faced depreciation from other people based on their gender (Ministry of Social Affairs and Health, 2017). These results are not in line with the findings of this study as men did not report experiences of gender-based bullying or depreciation. It might be that this is a difference between male-dominant IT field and general results in Finland.

The wage was a topic which is suffering the most notable inequality according to both general Finnish statistics and the results of this study in the Case company. The median salary of women in IT field is 10% smaller than the median salary of men according to the Finnish statistics (Suomen virallinen tilasto, 2018c). The actual differences of wage were not investigated in this study, but the topic raised strong reactions especially in women, but also some men had recognized that there are equality issues in the pay.

Some signs of similarities were also in the thoughts about the gender roles of parenting. According to equality barometer (2017) majority of Finnish people think that men should participate more in child care and parenting, and majority of women reported that they are the one who have the main responsibility of the taking care of the children in the family. Also, in the Case company it seemed that for many women the reason to put career advancement on hold was being busy with other things in life such as family. None of the men considered that being busy with other things in life had prevented them from applying new job roles.

Comparison to the gender equality legislation

The most obvious motivation for companies to do diversity and inclusion actions is the legal one as the gender-based discrimination of employees is illegal (Act on Equality

between Women and Men, 1986; Welle & Heilman, 2005). The objective of the gender equality law in Finland is to improve the status of women especially in the working life by promoting the equality between men and women and preventing gender-based discrimination from happening (Act on Equality between Women and Men, 1986, 1 §). Some of the suggested acts for employers mentioned in the law were about promoting the vacancies and recruiting which are out of the scope of this study. However, many other suggestions could be at least partly discussed within this study: promoting gender equality between men and women especially in pay, creating equal opportunities to men and women for career advancement, developing working conditions to ensure they are suitable for both women and men, to facilitate the reconciliation of working life and family life for women and men by paying attention especially on working arrangements, act to prevent the occurrence of discrimination based on gender. These acts are determined for the employers to do, but only as well as they see it is possible with the resources they have (Act on Equality between Women and Men, 1986, 6 §), which makes the law rather open for different interpretations.

Even though this study does not take a stance on how the equality in pay and career advancement have been organized in the Case company, it seems that the current procedures could be improved, or the communication could be more open since the wage differences seem to be an issue which has been recognized by both men and women, and a large share of women feel that their gender has been a disadvantage for them in the career advancement. Defects in working conditions however did not come up in the study, instead there were comments from both men and women that they consider that the work is equally suitable for both genders. However, there were signs that the Case company could deal with the working arrangements better to facilitate the reconciliation of work and family life. The family life seemed to hinder especially the career advancement of women, but there was also small finding which suggested that the climate is not always family friendly for men either. And lastly, even though the informal gender-based discrimination has decreased a lot during the last two decades there still are more or less severe harassment and bullying incidents which especially women need to face every now and then at work. The law says that the employer is not allowed to neglect such incidents if there are possibilities to eliminate them (Act on Equality between Women and Men, 1986, 8d §), but in this study it was not investigated what actions are currently done and is there something that could be improved.

In addition of the listed suggestions, the employers in Finland are also required to prepare every other year the gender equality plan with the description of the current gender equality situation and the planned actions. The gender equality plan of the Case company (Internal documents of the Case company, 2017) was used as a reference in this study to summarize the current situation of gender diversity in the company. Overall, the objective of this study was not to investigate how well the Case company had followed the gender equality law, but their willingness to go beyond the suggestions of law by putting efforts in finding the best solutions with for example the help of this research tells that the ethics and quality are topics they put value on.

The underrepresentation of women

The starting point in this study and also in the majority of the other studies of gender and IT was the underrepresentation of women in IT. The lack of women in the field is a problem both for the society and for the IT companies (Stout & Camp, 2014), and the academics have tried to find solutions for both the recruiting and retention. In Finland it seems that the underrepresentation of women in IT cannot be explained with the

discrimination of women in the recruiting process when they are entering the field, as both men and women become employed equally after the graduation (Suomen virallinen tilasto, 2018a). However, there is just not nearly as many women studying the field (Suomen virallinen tilasto, 2018b), and it seems to be challenging and time consuming to change as the reasons seem to lie deep in the societies (Tapia & Kvasny, 2004).

There are various theories of why girls and young women are not interested to even study for the IT field. Some have argued that women lack the mathematical abilities (Harvard University, 2005), others have speculated that the chilly environment towards women is the reason (Steward & LaVaque-Manty, 2008), whereas some say that it is a common perception that the highly pressured work in IT is not suitable for women with families (Frome, Alfred, Eccles & Barber, 2008). Women's lack of interest towards IT is a common explanation (Ceci & Williams, 2011). For the lack of interest there are many possible theories such as that in post-industrial nations, like in Finland, people choose occupations which are highly interesting for them and which they would even love. In contrast, in other countries people try to choose occupations which seem to be financially promising and therefore also women end up in the IT field. (Charles & Bradley, 2009.)

This study was not particularly suitable to investigate if these theories might be the reason for the women's underrepresentation in the field. Instead it would be interesting to see if these theories match with the perceptions of young women about IT field and their own abilities, at the time when they are making choices for their future occupations. Although these theories were not investigated in this study it seemed that most of them did not apply on the women who work in IT field. The interviewed women of this study seemed to indeed like their work in the field of IT, and they had chosen the work in IT because of their own interest. The overall experiences of social environment of both women and men seemed generally positive, although women had experienced more negative behavior from some individuals at the workplace. Also, even though family reasons seemed to slow down the career advancement of women there were no signs that the work in IT would not be suitable for women with children.

Some scholars argue that even though the recruiting problems of women are clearly more in our face, still the existing retention problems of women in IT should not be overlooked as constantly high number of women decide to leave their career in the IT field (Holtzblatt & Marsden, 2018a; McGee, 2018). Also, it was suggested in the report of McKinsey & Company that the IT companies would benefit the most if they would put efforts for both the recruiting and the retention of women (Hunt, Prince, Dixon-Fyle & Yee, 2018). The possible reasons of the retention problems have been investigated both with the women who still work in the IT field and with the women who have quitted their career in the field. Even though the retention rates of men and women in the Case company were not investigated in this research, this study focused on the retention and especially on discrimination in the workplace, which could be one possible reason for inequality and negative experiences, and in the end the retention problems (Ensher, Grant-Vallone & Donaldson, 2001; Shaffer, Joplin, Bell, Lau & Oguz, 2000). For example, also Holtzblatt and Marsden (2018a) and McGee (2018) have investigated the experiences of women in the IT workplaces to find solutions for better retention of women.

Workplace discrimination

According to Dipboye and Halverson (2004) the workplace discrimination occurs when individuals of other group are put at a disadvantage compared to other groups with the level of potential or proven success. A recent study of Frank and Parker (2018) showed

evidence that women experience far more gender-based discrimination compared to men in IT field. The types of discrimination they face are various, other types are easily observable and some less visible. In this study the easily observable types are categorized more distinctly as formal discrimination, and the less visible as informal discrimination. The formal type refers to the biased usage of organizational resources such as pay, promotions and job responsibilities. Instead, the informal type is about the interpersonal relationships between the employees and about the quality of the relationships. (Welle & Heilman, 2005.)

Easily observable types are usually the ones which are clearly unacceptable, and they are often prevented with organizational actions and policies (Shih, Young & Bucher, 2013). However, also the less visible types of discrimination such as social exclusion and lack of mentoring can have at least as substantial effects on the career advancement and retention of women than the more visible types (Jones et al., 2016; Welle & Heilman, 2005). There are several reasons which can explain the substantial effects. First, the less visible discrimination is hard to detect, for even the ones who experience it. Partly this is because the person experiencing this type of discrimination might feel that the fault is in him or herself. (Jones et al., 2016.) In addition, some authors argue that men are even less likely to believe that the less visible types of discrimination would have an effect on the careers of women (Welle & Heilman, 2005). Second, there are usually no formal policies for reporting this type of discrimination, and therefore the options to act against it is dependent on the ones who experience it (Jones et al., 2016). The reviewed literature in this thesis did not provide any quick ready-to-use suggestions for the informal discrimination. It is hard to define clearly what kind of behavior is unacceptable informal type of discrimination since it is happening in the interpersonal communication between persons. This is however one reason why it might occur more often than the formal type of discrimination which is already commonly considered not acceptable in the working environment (Jones et al., 2016).

Both the formal and informal types of discrimination towards women seem to be still existing in the IT field. The types of discrimination towards women which occur the most according to the recent study (Frank & Parker, 2018) are earning less than men in the same job, receiving less support from manager than men in the same job, facing such treatment as if they were not competent, and experiencing repeated small slights in the workplace. Very same types of results were also found in this study about gender-based discrimination. Also, findings about gender-based discrimination in career advancement were found. Even though the differences in how much men and women get invited to interviews and get chosen to the role were rather small in the survey results, they were still supported with the large share of women who felt that their gender had been a disadvantage in their career advancement. In addition, prior literature suggests that even small bias against women in promotion at every level of organization can lead to having very small number of women in the highest levels of the organization (Martell, Lane & Emrich, 1996).

The research approach and used theories

Trauth and Howcroft (2006) have said that the consideration of the epistemology is equally important as the choice of a theory in gender and IT studies. In gender and IT studies the positivist approach is neutral investigation whether there are differences between genders, and interpretive epistemology aims to offer understanding of why gender differences occur by considering the context. Traditionally the research has focused more on these two epistemologies but recently scholars such as Trauth (2013)

have criticized that focusing only on these descriptive studies makes the stereotypes even worse. According to Trauth (2013) the best option would be to balance the use of descriptive epistemologies with the use of critical approach which aims to challenge and undo the existing inequality with actions and interventions. This study represents both the positivist and interpretive epistemologies, and therefore the best further actions to complete this study would be to apply the critical approaches and try to undo the gender-based discrimination with organizational actions and interventions.

Theories such as individual differences theory and social shaping of gender are commonly used in interpretive studies (Trauth & Howcroft, 2006). Many recent studies of women in IT (McGee, 2018; Trauth, Quesenberry & Yeo, 2005) emphasize the individual differences theory of women and IT (Trauth, 2002) and therefore do not want to generalize the results of their study. Also, in this study I have tried not to over generalize the results by describing clearly in what extent the findings occurred. However, in this study the differences between women for example with or without children, with short or long working history in the field, and with managerial or in technical roles have not been investigated because it would have harmed the anonymity of the participants. Therefore, the individual differences theory had been applied only on the extent which was ethically possible for this research.

The subject of gender in this study is viewed from the point of the social shaping of gender or so-called sociocultural theory (Eagly & Wood, 1999). The theory rejects permanent bio-psychological gender differences, but still categorizes men and women as two separate groups.

Instead of using the social shaping of gender theory some scholars like Hyde (2014) and Trauth (2013) suggest using either intersectional approach which considers also other identity characteristics, such as race and gender identity, or contextual approach in which the aim is to consider what is the context in which the differences occur. These approaches however were not suitable for this study. Using these two approaches was not an option as the number of employees in this empirical study was too small and all employees were working in the same location, so combining other identity characteristics or contextual information to the study would have been a too big risk for the anonymity of the participants.

Gender similarities theory (Hyde, 2014) is also a theory which is suggested to be used instead of other gender theories. Hyde (2005) argues that according to her meta-analysis most of the found gender differences in studies have been small or close to 0. Therefore, Hyde says that documenting gender differences is relatively unimportant, and instead we should try to find training methods and intervention which could bring the best out of everyone. Most importantly gender differences should not be over emphasized in research papers (Hyde, 2014; Trauth, 2013), which is a guideline I have tried to follow also in this research.

The similarities and differences between the background information of men and women were investigated to get an image what are bases for their experiences and perceptions. Some scholars (Quesenberry & Trauth, 2007) have highlighted that in order to really understand the women in IT, it is crucial to understand what women want from their career and what are the values and motivations of women in the IT field. According to the results of this study women and men in the field of software development have generally very similar career orientations what comes to having a technical or managerial career (Table 1). Also, equal share of women and men thought that their current job was matching well their career orientation which is considered to be strongly in contact with

feeling generally satisfied with the work and not feeling the need to leave (Igbaria et al., 1991). However, the results of this study also suggested that there might be some differences how women and men perceive the career advancement, as women seemed to be considering their moves more carefully and they seemed to be more apt to putting their career partly aside when they are busy with other things in life, such as having children.

Motivation for the diversity and equality studies

Effects of gender diversity in different organizational contexts such as teams, leadership, management and boardrooms have been studied a lot. The results of the gender diversity studies have been various, and conclusions have been sensational suggesting that diversity is either very bad or very good for the performance of the companies.

However, this study does not focus on material consequences of gender equality and diversity, such as performance, efficiency, competitiveness or good practices. According to Vehviläinen and Brunila (2007) it is common for equality workers that they feel pressure to produce this kind of information which can favor management, but they suggest that the equality should be an objective as itself. Trauth (2012) states that the current states of gender diversity and equality in IT field still need more efforts, otherwise they will be just accepted as something that is normal. I hope that the value of the qualitative studies in this field would be recognized, as they are important instruments in understanding the phenomena.

5.3 Practical implications

Most companies have organized their diversity work by establishing a diversity program, but also, so called women affinity groups which are often informal are common to provide educational, professional and networking opportunities for women (Annabi & Tari, 2018). These strategies to put plans in action are feasible, as long as the actions are well considered. According to previous studies the most common contents of gender diversity programs are the building of a culture which supports diversity, providing professional development opportunities, and providing flexible work arrangements (Annabi & Lebovitz, 2018). However, this type of content is very general and leaves a lot of room for different interpretations, as these actions are not defined in detail or linked to actual goals, behaviors and performance measurements (Annabi & Lebovitz, 2018; Welle & Heilman, 2005). Welle and Heilman (2005) believe that the organizational actions can moderate the extent of discrimination at work if several simultaneous efforts are taken and the links between actions and the real objectives are defined. The suggestions in this chapter are maybe not the only ones that should be done to improve gender equality in the IT companies, but they are especially based on the findings of this research.

Because the findings of this study are based on the experiences and perceptions of the participants, some findings might need to be completed first with further information. One of these types of findings is the wage differences. Internal data and statistics about the wages of employees is probably already existing and quite surely the gender equality of wages is currently already monitored as it is required by the gender equality law. However, controlling the wage differences is challenging for example because women are often absent from work long periods when they are having children and the pay rises the men meanwhile can achieve can be challenging to catch at once. The actual reasons behind the perceived wage differences were not investigated in this study, but since the experience of inequality in this topic was so notable, I suggest that if it is not possible to

fix all the existing wage differences, at least the reasoning behind the differences should be more open for the employees. It might be even possible, still highly unlikely, that all existing wage differences between employees are well reasoned, but since the wage information is kept private, people have misperceptions about the wages of others.

The inequality in the career advancement between men and women was another very notable finding in the experiences and perceptions of the participants. Getting more women on higher positions of the company was one of the most wanted actions to improve gender equality. The actions which Welle and Heilman (2005) suggest for companies are to make the decisions of recruiting based on the accurate knowledge of the job, hold the managers responsible for bias-free decisions, use structured evaluation techniques, and support formal mentoring by creating processes to build the mentor-mentee relationships.

In addition, the findings suggested that men and women might perceive career advancement differently. The family reasons seem to affect more women, and it seemed that women are putting the career advancement aside more easily than men because of the things which keep them busy outside of work. Women seemed also be thinking more carefully the moves they make if they want to level up in their career compared to men. Partially men and women wanted also different type of career support. Holtzblatt and Marsden (2018a) suggest that there are certain critical factors which are especially important for women working in the IT field. Their studies in the field have suggested that especially women need local role models and support to recognize their personal power. Local role models are other relatable men or women working locally on the same site on upper level roles and whose life seems desirable even if they have more responsibilities at work. To get the most out of the local role models also Holtzblatt and Marsden (2018a) suggest the mentor-mentee relationships. Then, the recognition of personal power needs support, because women are more likely to doubt their skills, readiness and value. The type of support which helps the women are giving feedback and helpful critique, setting clear expectations and coaching. Holtzblatt and Marsden (2018a) note that even if they have found out that these are the critical factors for women, it does not mean that the men do not need this kind of support.

Many of the actions suggested by Welle and Heilman (2005) and Holtzblatt and Marsden (2018a) require resources from managers. Therefore, it is important to ensure that managers have abilities and time to give the employees, not just women, higher quality support, considering if the employee is wishing to have support from the manager, since at least the career advancement support was something not everyone is hoping to get from the manager.

Even though majority of the most notable findings of this study were about formal discrimination, the challenges and unacceptable behavior the women are experiencing in social situations cannot be overlooked. Since informal workplace discrimination occurs in the interpersonal communication between employees, it is especially challenging for the company to provide ways to assess and interfere those situations. I believe that undoing the formal discrimination improves also the general status of women in the workplaces which slowly decreases the informal discrimination. Since this change is happening slowly, it is important in addition to communicate clearly what the inclusive culture means in practical terms, what kind of behavior towards others is not acceptable within the company, and what are the consequences of such behavior. This type of communication is important to ensure that the informal discrimination is not overlooked, which could prevent it from happening in the first place.

According to Welle and Heilman (2005) discrimination is often the impact of stereotyping processes which are happening outside of our conscious awareness, and therefore it is likely that we do not even notice the ways our attitudes guide our behavior. These unconscious biases in our attitudes can however be tested by individuals themselves with for example the Implicit Association Test (IAT) (Greenwald, McGhee & Schwartz, 1998) or conjoint analysis (Caruso, Rahnev & Banaji, 2009). However, it is natural for us to react defensively to unexpected results of such tests like these, because we often believe that our thinking is less biased than others. Therefore, it would be good to combine bias testing with other types of education about the topic. (Howell & Ratliff, 2017.)

Combining individual efforts to organizational changes is the most effective way of improving the equality and inclusion in the workplaces (Tapia & Kvasny, 2004). One possible organizational effort for gender diversity and equality in IT companies is to adapt the agile development approach. Multiple scholars have argued that since agile approach emphasizes the management style which is more common for women, there is a great chance to improve the representation of women in the decision making and in the end the gender equality (Hazzan & Dubinsky, 2006; Weilemann & Brune, 2015).

Even though this study was not especially about gender diversity, it seemed to be important topic for the employees, both women and men, who participated the study, and indeed the topic is important for several reasons. In this study hiring more women to the company was far more wanted action than the actions to improve the actual gender equality. Since recruiting is challenging because of the low number of women and girls studying the suitable fields, actions should be done to get girls more interested towards the IT field.

Lastly, even though the results of the survey showed that the local women affinity group was far better known by women of the company, still also men considered the gender equality as an important topic. The survey received several positive feedback comments especially from men. It is largely recognized that improving gender equality is not about taking something away from the men, and possibly if the local women affinity group would get to be in the limelight a little more, and if they would point out their goals compactly and clearly, some more men would be glad to join to support the activities.

6. Conclusions

The underrepresentation of women in IT is both economical and humanitarian problem (Stout & Camp, 2014). The prior literature suggests that IT companies are not only having major problems in recruiting of women since the number of women studying the suitable fields is so low (Suomen virallinen tilasto, 2018b), but also keeping the women in the companies since they are more likely than men to change the career in IT to something else (Ashcraft, McLain & Eger, 2016; Gammal & Simard, 2013). Gender-based discrimination is one of the possible reasons for the low retention as women in tech face much more discrimination than men (Funk & Parker, 2018). The effects of different types of discrimination have been investigated before by many scholars (Dipboye & Halverson, 2004; Jones, Peddie, Gilrane, King, & Gray, 2016; Welle & Heilman, 2005), and this study investigated if there still is gender-based discrimination in the IT field and what it is like.

The findings suggested formal gender-based discrimination towards women in wage, career advancement and management, and informal gender-based discrimination in social environment. Formal discrimination affects the use of resources, and informal discrimination occurs in the daily social situations at the workplace. Both these types seemed to affect the women's experience of gender equality at the workplace negatively, and they both have a potential to affect the retention of the women in software development. Also, couple of small findings were made about the potential gender-based discrimination men may have faced.

I would suggest that the practitioners in the IT companies would take an active role and implement actions and interventions to improve gender equality. Organizing the work for gender equality and diversity happens most often by establishing a diversity program and supporting the work of informal women affinity groups in the company. I recommend combining several efforts on both organizational and individual level.

This study was conducted in a large-scale IT company which needs to be considered with the findings. The work in large-scale IT companies is somewhat different compared to smaller companies, as one of the interviewees described "*stiffer and more political*" than in smaller companies. The big number of employees, numerous different teams, departments and sites in many different cities and countries are challenging to manage in many ways and therefore controlling the whole can make the big companies seem stiffer and more political than the smaller ones. Also, corporations are often observed more carefully, and they may have a pressure to fulfill and even exceed the expectations of quality and ethics. Because the different nature of work and management of different sized companies, I consider that this study is not necessarily comparable to other studies conducted in smaller IT companies. It might be that the results in other large-scale IT companies would be different too, as the cultures and values may vary between companies and this study was conducted in a single company.

Regarding the main research question, "*What kind of gender-based discrimination is there nowadays in software development of large-scale IT companies?*", the main limitation of this study is that the findings are based on the responses of participants, their experiences and perceptions. The findings are still convincing, and the experiences and perceptions of individuals cannot be overlooked even though they are subjective in nature. However, some findings, like wage differences, call for further information to really understand what is behind the issue. Also, the responses were received only from 52% of

the employees who received the survey, which is a very good rate, but still the viewpoints of the rest 48% remained unknown.

Ensuring the anonymity of the participants also limited the analysis of the results. Other independent variables than *gender* was not used in the analysis of the survey results. For example, it could have been interesting to see if the responses of employees with shorter working experience in the company were similar compared to those who had been there over 20 years.

Also, some questions of the survey could have been formed more clearly. The regularly organized resource balancing review (the Case company uses a specific term, which was used in the survey) was not familiar for all the respondents. A clarification for the term was added due to the request of one respondent who contacted the author after the launch of the survey. Afterwards also the statement "*The management style is fair in my organization*" could have been clearer as *management style* and *fair* can be understood in various ways.

Improving gender diversity in the IT field has been a true challenge for decades. Probably the biggest efforts are currently focused on changing the general perceptions of IT field and perceptions of what the work in the field is like and who are capable of doing it. Still, the retention problems cannot be overlooked either. I hope that the companies in the field would monitor their statistics of the retention and would interview everyone who leaves and would use this information to improve the experiences of their current employees. Staying aware of the work experiences of employees and being active in improving the conditions will for sure have only positive effects in the long run. This thesis provides focus of what issues related to gender equality are the most important that should be put the most efforts on.

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Appendix A. Survey questions

Gender Equality survey

This survey is assigned to the local Case company Organization-1 and Organization-2 (the names of the organizations have been changed) employees. Each respondent will have a possibility to response for this survey only once. Answering the questions takes about 5-10 minutes. There are 28-33 questions, depending on your answers.

The data gathered with this survey will be used for the internal development purposes of the Case company such as defining strategy and goals for gender diversity and equality activities, and to the research purposes of Gender Diversity thesis work of Anna Kivelä.

The anonymity and privacy of all respondents will be ensured by following the current practices of the Case company HR department. The data will be analysed and presented respecting the privacy of all respondents. A nominated HR representative (owner of the survey form) will filter out all data which might endanger anonymity.

Basic information

1. Organization
Organization-1 / Organization-2
2. Gender
Man / Woman
3. Working experience in IT industry (years)
Under 5 / 5-10 / 10-15 / 15-20 / Over 20
4. Working experience at the Case company (years)
Under 5 / 5-10 / 10-15 / 15-20 / Over 20
5. How long have you worked in your current position? (years)
0-2 / 2-5 / 5-10 / Over 10
6. Would you consider your job role as:
Technical / Managerial / Both technical and managerial / Other

Current status

7. How does your education match into your current role in the organization?
Not at all / Partly / Mostly
8. Are you satisfied with your current role?
Yes / No
9. Are you inspired with your current role?
Yes / No

10. Regarding your current career orientation, to what extent do you agree with the following statements:
 I'm interested to advance on managerial career path
Strongly disagree / Disagree / Neutral / Agree/ Strongly Agree
 I'm interested to develop my technical skills
Strongly disagree / Disagree / Neutral / Agree/ Strongly Agree
 I'm interested to change to a new competence area
Strongly disagree / Disagree / Neutral / Agree/ Strongly Agree
11. How does your current career orientation (in previous question) match into your current role in the organization?
Not at all / Partly / Mostly
12. Have you been in job rotation?
Yes / No
13. Have you been reassigned with the regularly organized resource balancing reviews [the name of the procedure has been changed] during last two years?
Yes / No
14. If Yes: Did your job role change as a result of the regularly organized resource balancing review?
Yes / No

Career advancement

15. During your employment, when was the last time you applied a new job inside the Case company?
Within the last year / Within the last five years / Before the last five years / I have not applied another job within the Case company
16. If Within the last 5 years: Was the job you applied on the upper level compared to your current role?
Yes / No
- If Not applied during last 5 years: Why haven't you applied another job recently inside the Case company?
I have been happy with my current job, There has been no interesting job opportunities available, I have been busy with other things in life, Other, what?
17. Have you been interviewed to a new job position inside the Case company during last year?
Yes / No
18. If Yes: If you have been interviewed during the last year, were you selected into the new position?
Yes / No
19. Do you feel that there is an opportunity at the Case company to fulfil your personal career aspirations?
Yes / No / Not relevant for me

20. If No: Why do you feel there are no opportunities at the Case company to fulfil your personal career aspirations?
Free text
21. Have you plans to level up at the Case company?
Yes, in long run (> 2 years) / Yes, in near future (< 2 years) / Not sure if I want to / No
22. Do you feel the communication of open leader positions is reaching all necessary employees?
Yes / Not always / No / Neutral
23. Do you feel that open leader positions are fulfilled with a fair recruiting process?
Yes / Not always / No / Neutral
24. What kind of support you would like to get at the Case company for your career planning?
Mentoring, Sharing the Experiences, Trainings, Social Networking, Identity management, Lecturing, Vocational Guidance, Support from line manager, Push from line manager, Supportive work community, Other, what?
25. Have you discussed with your current line manager about your career plans?
Yes / No
26. If No: Why haven't there been any discussions about your career plans between you and your line manager?
Free text

Daily working experience

27. In your work community at the Case company, have you experienced any sort of bullying? (Bullying, Feeling outcast, Depreciation from a colleague or from line manager)
Yes / No
28. If Yes: What do you think might be the trigger for bullying?
My age, My gender, My cultural/geographical background, My job role, My opinions, My sexual orientation, My health condition or injury, My parenthood, My pregnancy, My character, My educational background, My language, Other, what?
29. How would you estimate the equality between men and women:
at the Case company in general?
Men and women are equal / There are slight issues with gender equality / There are significant issues with gender equality
in your organization at Organization-1 or Organization-2?
Men and women are equal / There are slight issues with gender equality / There are significant issues with gender equality
30. To what extent do you agree with the following statements?
There is a good team spirit in my work community
Strongly disagree / Disagree / Neutral / Agree / Strongly Agree
I can get help from my colleagues

Strongly disagree / Disagree / Neutral / Agree / Strongly Agree
 I am appreciated in my work community
Strongly disagree / Disagree / Neutral / Agree / Strongly Agree
 The tasks I get match well with my own expertise
Strongly disagree / Disagree / Neutral / Agree / Strongly Agree
 I get support from my line manager
Strongly disagree / Disagree / Neutral / Agree / Strongly Agree
 The management style is fair in my organization
Strongly disagree / Disagree / Neutral / Agree / Strongly Agree
 I am able to influence the decisions regarding my job
Strongly disagree / Disagree / Neutral / Agree / Strongly Agree
 I won't be judged if I need flexibility (e.g. because of family reasons)
Strongly disagree / Disagree / Neutral / Agree / Strongly Agree

31. At the Case company, have you experienced that your gender has had any impact regarding:

Your salary

Advantage / Disadvantage / No impacts at all / I'm not sure

Your career advancement

Advantage / Disadvantage / No impacts at all / I'm not sure

Your possibilities to get more training/education

Advantage / Disadvantage / No impacts at all / I'm not sure

Your possibilities to get access to information you need at your work

Advantage / Disadvantage / No impacts at all / I'm not sure

The continuity of your employment

Advantage / Disadvantage / No impacts at all / I'm not sure

The assessment of your individual performance

Advantage / Disadvantage / No impacts at all / I'm not sure

Building informal relationships (informal mentoring, friendships...)

Advantage / Disadvantage / No impacts at all / I'm not sure

Feedback

32. Are you familiar with the local gender diversity network in local site of the Case company?

Yes, I think I know the network well / Yes, I know something about their activities / I have heard about it, but don't really know about their activities / No, I haven't heard about it before

33. Additional comments and feedback for the survey:

Free text

Appendix B. Interview questions

(Translated from Finnish)

1. How long have you been working on the field of IT?
2. How long have you been working for the Case company?
3. How many women and men there are in your current team?

Career and career goals

4. Has your perception of the IT field changed during your career at the Case company?
5. Are your career goals different nowadays compared to the time when you were starting your career?
6. Have you considered leaving the Case company at some point of your career?
7. (If the answer was “No” to the questions 4.-6.)
Please, tell about your career. What kind of phases there has been on your career?
8. (If the interviewee has been working elsewhere than the Case company)
Was the career development somehow different in other companies than in the Case company?

Work community

9. How would you describe the current state of the equality between genders in your organization?
Men and women are equal / There are slight issues with gender equality / There are significant issues with gender equality
(If the interviewee does not consider men and women equal)
Please, tell what kind of equality issues you feel there are in your organization?
10. Do you feel that men and women have nowadays equal possibilities to create social relationships in your organization, and are the quality of the relationships as good for men and women?
11. Do you feel that you and your expertise are appreciated in your organization nowadays?
12. Have you noticed if there are different kind of attitudes and prejudice towards men and women in your organization nowadays?
13. Image, that there would be gender balance in the field of IT. This means that in all companies, including the Case company, there would be as much, evenly competent men and women working in all roles and levels of the company. There

would be also gender balance among the students in the STEM fields in the education systems.

13.1 Would your social relationships at work be somehow different?

13.2 Would the attitudes and appreciation of others be different in your organization?

13.3 Would your possibilities to develop your career be somehow different?

13.4 Would the beginning of a career be different for women who enter the field in the Case company?

Bullying and harassment

14. In your work community at the Case company, have you experienced any sort of bullying or harassment? (Bullying, Feeling outcast, Depreciation from a colleague or from line manager, Sexual harassment)
(If the answer is “Yes”)

14.1 What kind of bullying or harassment have you experienced?

14.2 When these situations have happened during your career? Have you experienced any bullying or harassment during the last two years?

14.3 What do you think might have been the trigger for the bullying or harassment?

14.4 How have you reacted to bullying or harassment? What kind of personal coping methods do you use in the situation or after? Have you used any help provided by the Case company?

15. Do you know if there has been any bullying or harassment towards other persons in your organization?
(If the answer is “Yes”)

15.1 What kind of bullying or harassment you know there has been?

15.2 Has there been any bullying or harassment within the last two years?

Internal actions for better gender equality

16. Please, list 3 actions, you would like to be done at the Case company to improve the gender equality?